Only B. F. Goodrich makes the grommet belts that cut costs 20 to 50%!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

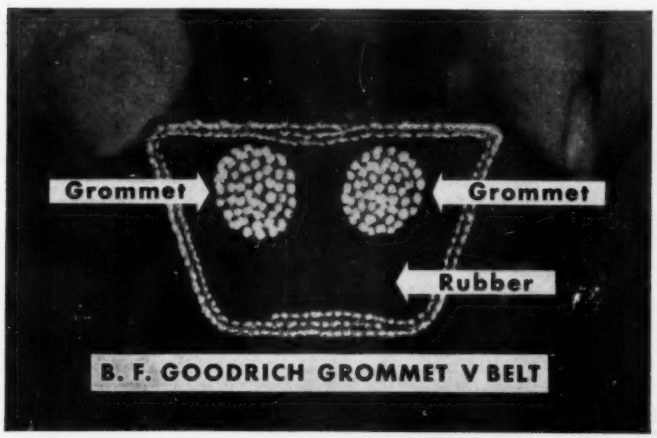
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V-Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. PE-11
Akron, Ohio

- ☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.
- ☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

Firm Name_____

_____

Street Address_____

City_____

State_____

For more facts circle 502 on Reply Card

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Mechanical Design Award Program

THE MECHANICAL Design Award Program, sponsored by The James F. Lincoln Arc Welding Foundation, is open to all persons who have actually been engaged in the design or manufacture of a machine or machine component.

Each author of every paper submitted must: 1. Be a resident of the U. S. or its possessions; 2. Have participated in the designing, planning, or manufacturing of the machine, or machine component described in the paper; and 3. Have been engaged as an officer, employee or consultant for the company or organization who manufactured or designed the machine or component described.

The paper must describe a machine or machine component which is either: A. Redesign of an existing machine or machine component previously made without the use of arc welding which has been redesigned so that arc welding may be used in whole or in part of its manufacture.

B. Redesign of an existing machine or machine component in which arc welding has been used in whole or in part of its manufacture but which has been redesigned to use arc welding to improve the operation or reduce the cost of machine or component.

C. The design of a new machine or machine component not previously manufactured, which has been designed so that arc welding may be used in whole or in part of its manufacture.

To qualify as subject matter the machine or component must have been designed, redesigned or manufactured within the period July 1, 1951 to July 27, 1953. All papers must be mailed on or before July 27, 1953.

Complete information on the award program may be obtained by writing to The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

Courses on Hydraulics

TWO NEW INSTRUCTION texts on hydraulics have been added to International Correspondence Schools courses in mechanical, chemical and electrical engineering.

Part One covers the nature of liquid flow, energy of liquids, Bernoulli's theroem, the Venturi meter, flow through orifices, flow through tubes, discharges of weirs, and many others.

Part Two deals with machines for developing water power, forces exerted on surfaces by flowing liquid, power losses and efficiency, Pelton wheels, reaction turbines and pumps.

Additional information on these new instruction texts may be obtained from International Correspondence School, Scranton, Pennsylvania.

Quien Sabe?

"The existence of a temporal region of experience from which a rational extrapolation may be made is postulated." *From a paper presented by L. M. K. Boelter, University of California, before the Centennial of Engineering.*

Time and Motion Study Clinic

THE SIXTEENTH Annual National Time and Motion Study Clinic will be held this year at the Sheraton Hotel, Chicago, from November 5 to 7.

An added clinic feature will consist of a group instruction and demonstration on the best methods of taking industrial motion pictures. In addition to this, there are the regular sessions on time and motion study methods used over the past year and how improved methods can be used in the future.

History of Electric Power

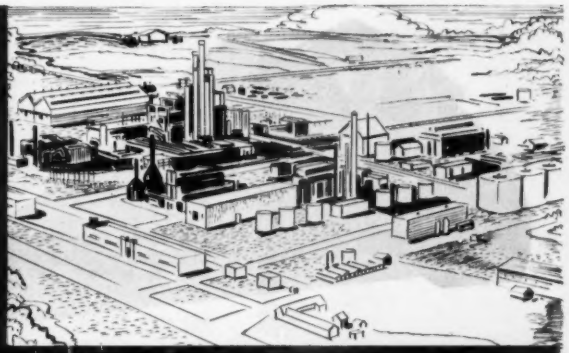
A SOUND-COLOR movie, "Freedom and Power," shows the importance of electric power in the American way of life. This 16mm movie, running time 29 minutes, is the latest presentation in General Electric's "More Power to America" series of visual programs.

Designed as a public-information vehicle to give people a better understanding of electricity's role in national welfare and security, the film traces the development of the power industry against the historical background of the colonists' struggle for freedom. The film shows electric power in home, farm, and industrial use today, and gives a glimpse into the future when atomic and solar

(Continued on page 6)

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R. authorized by Post Office.

A STEAM TRAP CASTS A MIGHTY BIG SHADOW!



THINGS STEAM TRAPS AFFECT	REASON	HOW ARMSTRONG TRAPS MEET THE NEED	EXAMPLE
1 HEAT-UP OR START-UP-TIME	When steam is turned on, large amounts of condensate and air must be removed.	Condensate and air are discharged as fast as they reach trap.	*40 Minutes Faster* Heat-up of drying oven at pharmaceutical plant with Armstrong "Blast" traps.
2 RATE OF PRODUCTION	Quick heat-up, maximum temperatures essential for maximum output.	Air and condensate discharged at steam temperature; equipment kept full of hot, dry steam.	*30% Greater Output* from jacketed kettles at Canadian plant since changing to Armstrong traps.
3 STEAM WASTE	When steam gets past traps, fuel is wasted, boiler capacity may be inadequate.	No steam ever reaches discharge orifice, even when there is no condensate load. Heat treated chrome steel valve parts, ground and lapped, resist wear, stay leak-tight for a long time.	*Steam Savings Eliminate Need for New Boiler* at chemical plant since installing Armstrong traps.
4 FUEL WASTE	Steam that blows through traps does no useful work, wastes fuel.		*33⅓% Reduction in Fuel Bill* after trapping vats with Armstrongs at Missouri plant.
5 CONTINUITY OF OPERATION	When traps are inoperative or down for repairs, unit being drained may be "off the line."	Nothing to clog, stick or collapse! Large orifice. Self-scrubbing action cleans out dirt, scale. "Frictionless" leverage, heavily reinforced. Wear and corrosion-resistant stainless trim.	*Maintenance Time Cut* 30% Illinois user says, "Unequalled dependability, simplicity of design means repairs can be made quickly" (with minimum equipment downtime).
6 MAINTENANCE COST	Traps that don't "wear well" take a lot of manhours for repair.		

BIG effects from little traps! And, the effects are multiplied by the number of traps in the plant you design or operate until they grow to be a major influence upon operating efficiency and economy.

Before you specify steam traps ask your nearby Armstrong Representative to call. He is qualified to give you practical assistance and answers that can save you a lot of time and trouble.

SEND FOR CATALOG

The 44-page Armstrong Steam Trap Book gives complete data on trap operation, selection, installation, maintenance, safety factors, etc. Free on request . . . Write:

ARMSTRONG MACHINE WORKS • 912 Maple St., Three Rivers, Mich.

ARMSTRONG STEAM TRAPS

For more facts circle 503 on Reply Card

SLY

PIONEERS AND LEADERS IN

DUST CONTROL

Sly Dust Filter at the Walker China Co., Bedford, Ohio, prominent in the production of vitrified china for 25 years.

Two points of dust origin. Note hoods into which *all* dust-laden air is drawn, thence piped to Sly Dust Filter.

YOU, TOO, CAN BENEFIT BY SLY'S KNOW-HOW

Over 100 different kinds of dusts are being collected with Sly Dust Filters. Thousands of installations are in operation — they collect *all* the dust.

Sly Dust Filters are used on such difficult dust as powdered sugar, bentonite clay, paint and pigments, aspirin and other pharmaceuticals, chemicals of all kinds, talc, lime, detergents.

Designed and engineered so that they save on space and power, Sly Dust Filters require less attention, less maintenance, yet — they are not expensive.

We offer you the benefit of 50 years' experience in solving all kinds of dust problems. Let us solve yours. A Sly engineer is near you. Ask for Bulletin 98.

THE W. W. SLY MANUFACTURING CO.

4600 Train Avenue • Cleveland 2, Ohio

New York • Chicago • Philadelphia • Syracuse
Detroit • Buffalo • Cincinnati • Minneapolis
St. Louis • Birmingham • Los Angeles • Toronto

For more facts circle 504 on Reply Card

History of Electrical Power

(Continued from page 4)

energy may be harnessed for power generation.

More information on how this film may be seen and the many other visual presentations in this series, may be obtained by writing to General Electric Apparatus Advertising and Sales Promotion Department, General Electric Co., Schenectady 5, New York.

National Power Show

THE TWENTIETH National Exposition of Power and Mechanical Engineering will be held in Grand Central Palace, New York, December 1 to 6. It will be held again under the auspices of the American Society of Mechanical Engineers, whose annual meeting will be in session during the same week.

As heretofore, the biennial event will include exhibits representing every kind of equipment used in the generation and distribution of power, with specific applications in many new and more efficient ways.

New Plant Engineer

James McCann was recently named plant engineer at the Engineering and Research Corp. of Riverdale, Maryland.

New Leaflets Aid Small Concerns

FOUR NEW leaflets, in a dual series of management and technical aids to assist small manufacturers, have been issued by the Small Defense Plants Administration.

One of the leaflets, "Reducing Accident Costs Through Safe Working Conditions," discusses plant inspection, planning layout, housekeeping, maintenance of plant, equipment and machinery, handling materials, electrical hazards, and safeguarding machinery.

The second leaflet, "Precision Measurement of Workpieces," has been issued to assist small firms engaged in defense production to manufacture products which will meet rigid inspection.

The third leaflet "Selecting the Right Tool Steel," explains the different types of alloys of steel that are encountered in the machine shop.

And the last leaflet, "Is Your Labor Turnover Cost Too High," outlines a workable method by which the small business can estimate what the labor turnover costs are and suggests methods for reducing their drain on business efficiency.

These leaflets may be obtained from the nearest SDPA field offices. Those firms desiring to obtain all of the leaflets in the series as they are issued should request that their name be added to the mailing list. Requests may be made to either the nearest SDPA field office or to the Washington Office, 1337 E Street, N. W., Washington, D. C.

'ROUND ABOUT

Air Conditioning Show

THE ELEVENTH International Heating and Ventilating Exposition will be held in the International Amphitheatre, Chicago, from January 26 to 30. The exposition is held under the auspices of the American Society of Heating and Ventilating Engineers in conjunction with the 59th annual meeting of the Society.

Instrument Maintenance Course

THE SECOND Annual Instrument Maintenance Short Course at Harbor Junior College will be conducted on November 20, 21 and 22nd.

The short course program has been expanded to meet all levels of need. This year's classes will be divided into two sections, designated the General Sessions and the Practical Methods.

Additional information regarding this instrument maintenance course may be obtained by writing to Donald R. A. Jones, Publicity Chairman, Southern California Meter Association, 6214 W. Manchester Ave., Los Angeles 45, Calif.

Fire Alarm Systems

SEVERAL HELPFUL pamphlets are distributed by National Fire Protection Association on fire alarm systems. Pamphlet 71 covers "Standards for Central Station Protective Signaling Systems"; pamphlet 72 covers "Standards for Proprietary, Auxiliary and Local Protective Signaling Systems"; and pamphlet 73 covers "Standards for Municipal Fire Alarm Systems."

These pamphlets, and many others, may be purchased in handy pocket editions at a low cost direct from the headquarters of the National Fire Protection Association, 60 Batterymarch St., Boston 10, Massachusetts.

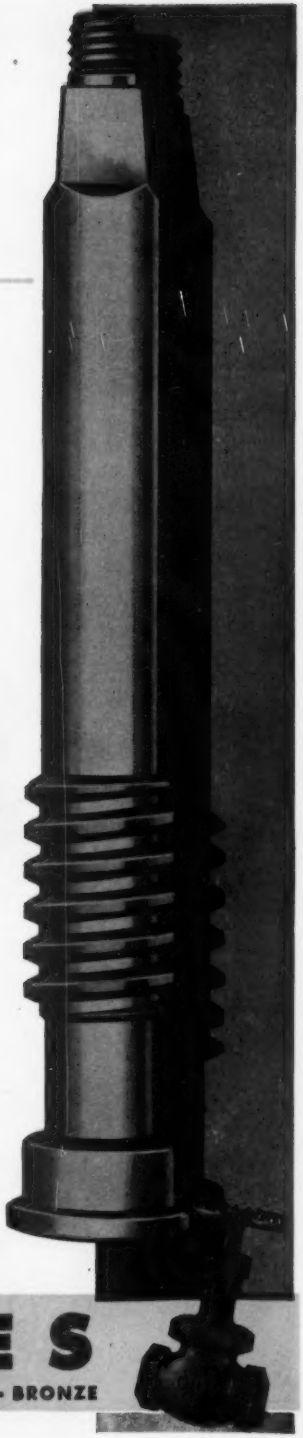
New Plant Engineers Club

PITTSBURGH is the newest addition to the list of cities that have a local Plant Engineers Club.

More information on this group and up-to-date data on the names of the officers and the meeting dates of the other clubs will be found on page 90 of this issue.

THIS STEM WILL LAST LONGER

. . . because it's machined from OIC Alloy 40



Months ago, we introduced Alloy 40 to the field; use has confirmed our laboratory tests. Now, we are ready to tell you about it.

Alloy 40 completely eliminates galling and seizing. It is harder and stronger. It is highly resistant to attack by corrosive liquids and semisolids. It lasts longer!

All OIC Bronze Valves are now equipped with Alloy 40 stems. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

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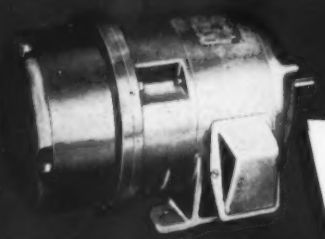


Brake motor using latest disk type brake mounted on BA drip-proof motor. Also available with totally enclosed and splash-proof enclosures for AC or DC applications.

Squirrel-cage splash-proof Form BA. Has corrosion-resistant covers which prevent entrance of splashing liquids.

Mill motor, W600 Series, DC. Conforms in all respects to AISE standards. Offers more power without an increase in the frame size.

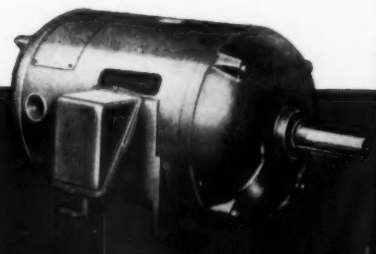
Dirt, dust, fumes or moisture can't get in... Heat can't stay in!

...the

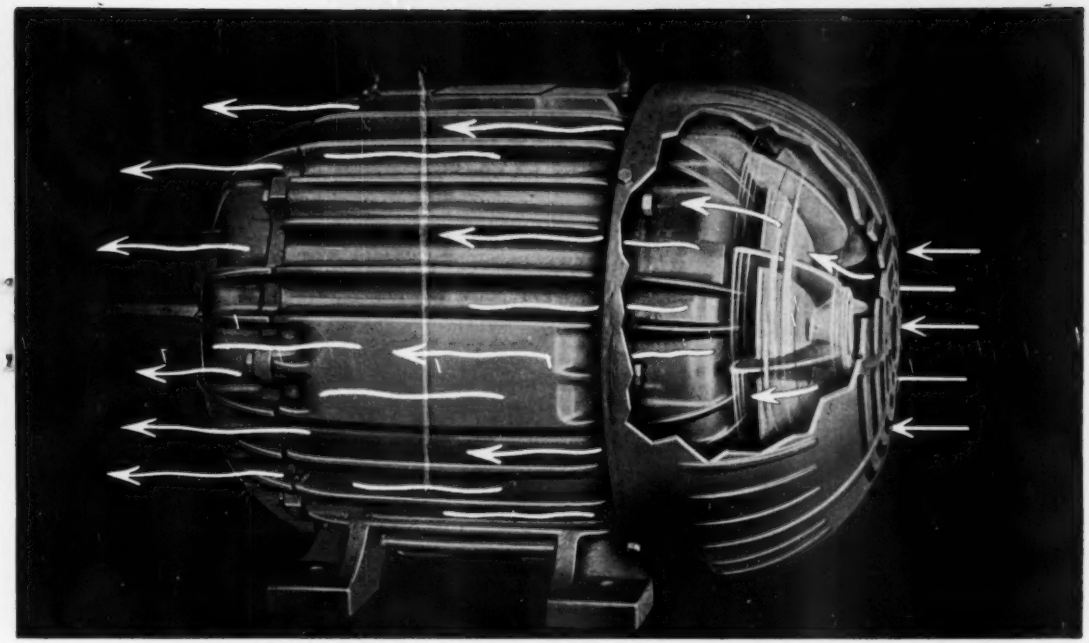
Elliott C-W Sealedpower totally-enclosed fan-cooled squirrel-cage motors are made in capacities from 3 to 125 hp. Write for Sealedpower Bulletin SL-300-2A.

Also available as explosion-proof underwriters approved in most ratings. For full details write for Bulletin PB-6000-2. Address your request to Elliott Company, Jeannette, Pa.

...with the ELLIOTT CROCKER-WHEELER complete motor line, you can meet 'most any integral motor need!



Wound-rotor protected type Form BW. For slow, smooth acceleration, high starting torque with low starting current, or variable speed. Drip-proof, splash-proof, 1 to 200 hp.



ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

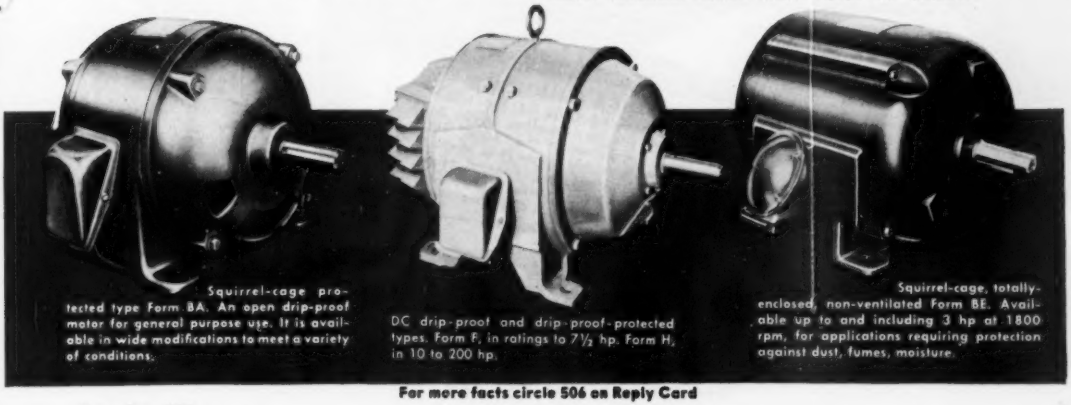
Here's a motor that doesn't care how tough the conditions are. Blizzards of dust or grit can't affect it—not only can't get *in*, but can't even stay *on* the outer case. The powerful fan-driven, cowl-directed air blast sweeps it off, and also drives off the heat radiated from the many fins.

Easy to see why this Sealedpower motor has for *eleven years* been the ace-in-the-hole among engineers who are confronted with drive conditions that would defeat ordinary motors.

Thousands now in service, and going strong in oil refineries, lumber mills, chemical and textile plants, outdoor and indoor installations everywhere. Get the facts.

ELLIOTT COMPANY
Crocker-Wheeler Division
AMPERE, N. J.

For large motors: RIDGWAY DIV., RIDGWAY, PA.
Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES
ELLIOTT APPROVED SERVICE SHOPS COVER THE COUNTRY



Squirrel-cage protected type Form BA. An open drip-proof motor for general purpose use. It is available in wide modifications to meet a variety of conditions.

DC drip-proof and drip-proof-protected types. Form F, in ratings to 7½ hp. Form H, in 10 to 200 hp.

Squirrel-cage, totally-enclosed, non-ventilated Form BE. Available up to and including 3 hp at 1800 rpm, for applications requiring protection against dust, fumes, moisture.

For more facts circle 506 on Reply Card

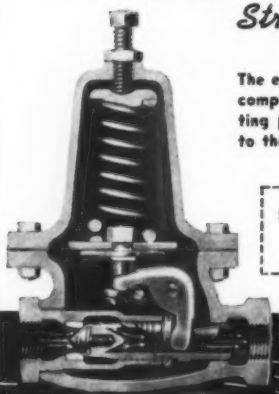
A LONG LIFE and a busy one..

CASH STANDARD Streamlined TYPE 1000 PRESSURE REDUCING VALVE

●Long life, and busy too, because this type "1000" valve does not fail—it's as dependable when production continues at high rate, like today, as when things are normal. Streamliners in thousands of plants these past years—and still serving well prove this. One user wrote, "We could not afford to take chances on time out for job repairs, that is why we used your valve on this job."

No trouble from lack of capacity with this valve! Even under peak load, or sharp changes in demand, the aspirating effect gets the valve wide open for maximum flow. Users know this and will vouch for it.

Write today for Bulletin 1000—eight pages of valuable valve facts.



Streamline Design means

LESS MECHANISM

The elimination of small ports and passages and complicated mechanism with but few close fitting parts gives you more in service and adds to the life of the "1000" valve.

NET RESULT TO YOU

Maximum Capacity When Needed Most • Accurate Pressure Control Under Toughest Working Conditions • Trouble-Free Service • Smooth Operation • Tight Closure • Accurate Regulation • Speedier Production Results • Elimination of Failures • Constant Delivery Pressure • Cost Saving Operation • No Spoilage • Practically Zero in Maintenance Costs.

Streamlined FOR SMOOTH, EVEN FLOW OF STEAM, WATER, AIR, OIL, ETC.

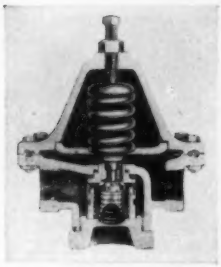
TURBULENCE ELIMINATED
The streamlined form of the inner valve produces the flow pattern shown here. It is the reason users of the "1000" valve get maximum capacity when it is needed most and accurate pressure control even when production hits non-stop proportions and operating conditions really are tough.

CASH STANDARD CONTROLS.. VALVES

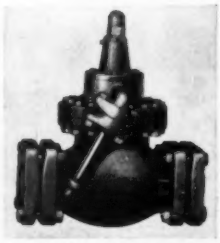
A. W. CASH COMPANY
DECATUR, ILLINOIS

For more facts circle 507 on Reply Card

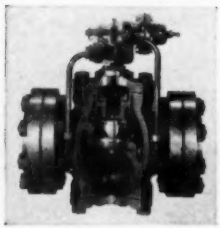
BULLETINS AVAILABLE ON OTHER CASH STANDARD VALVES
Send for them



Bulletin 950—features the CASH STANDARD Type D Single Seat Pressure Reducing and Regulating Valves for use with most fluids. Shows simple inner working parts that save in maintenance. Diagram explains how valve works. Blueprint shows simplicity of installation.

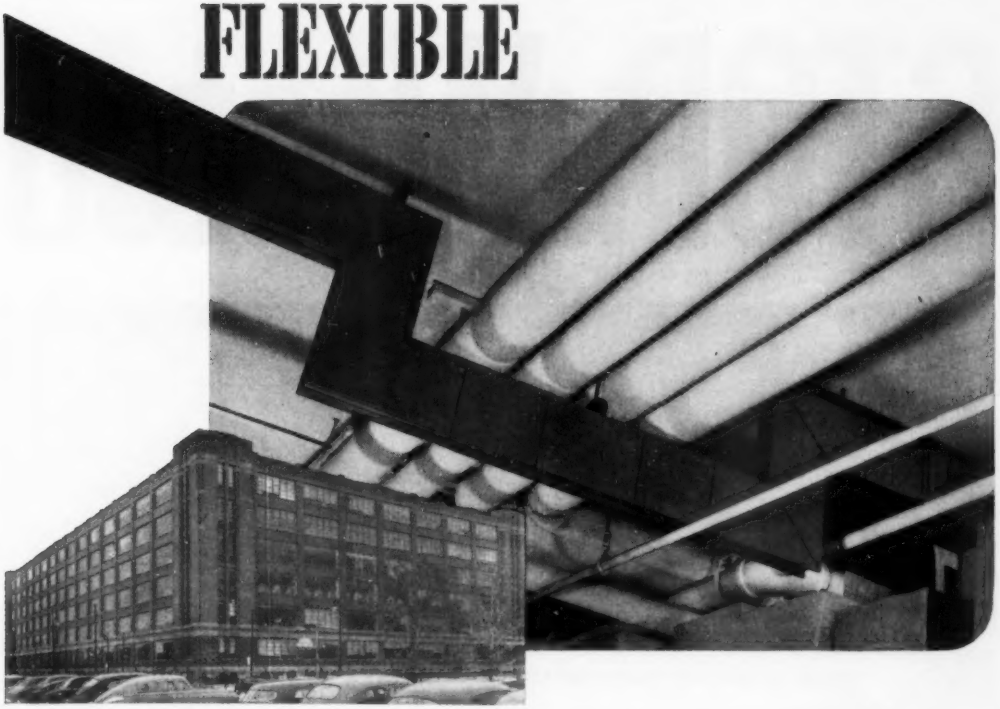


Bulletin 956—features the CASH STANDARD Type 4030 Back Pressure Valve — designed to automatically maintain a constant pressure in the evaporator corresponding to a constant temperature desired. Shows an Ammonia and Freon Gas Capacity Chart based on ABSOLUTE pressures.



Bulletin 966—features the CASH STANDARD Self-Contained, Pilot Operated Type 10 Pressure Reducing and Regulating Valve for use with water or air; with any gas or oil that is non-corrosive; and with refrigerating fluids such as Ammonia and Freon. Many interesting particulars explained such as: how valve works, tight seating, large capacity, no waste, no water hammer or chatter.

BUS DUCT IS FLEXIBLE



Parke, Davis & Company plant modernizes with Westinghouse Bus Duct

"Neat . . . clean . . . flexible!", say Parke, Davis & Company engineers about the installation. The contractor reports, "My men liked installing Westinghouse Bus Duct . . . and the ease of mounting it around pipes, through walls and across wide open spaces saved us considerable time and money."

This vast installation of standardized Low Impedance and Plug-In Bus Duct has recently been completed at the Parke, Davis & Company, Detroit, Michigan, where a complete changeover was made from a d-c to an a-c system.

This duct has greater current-carrying capacity pound for pound than any other means of secondary power distribution. Plug-In Duct has outlets every foot to allow for rapid machine tie-ins. Duct sections are fully salvageable and can be expanded or relocated with little effort.

Four types of Westinghouse Bus Duct are available to meet any load condition and service requirement. Call your Westinghouse Representative for complete details or write for B-4272-A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-30107

YOU CAN BE SURE... IF IT'S Westinghouse

BUS DUCT

DESIGN TESTED AND VERIFIED in the Westinghouse HIGH POWER LABORATORY

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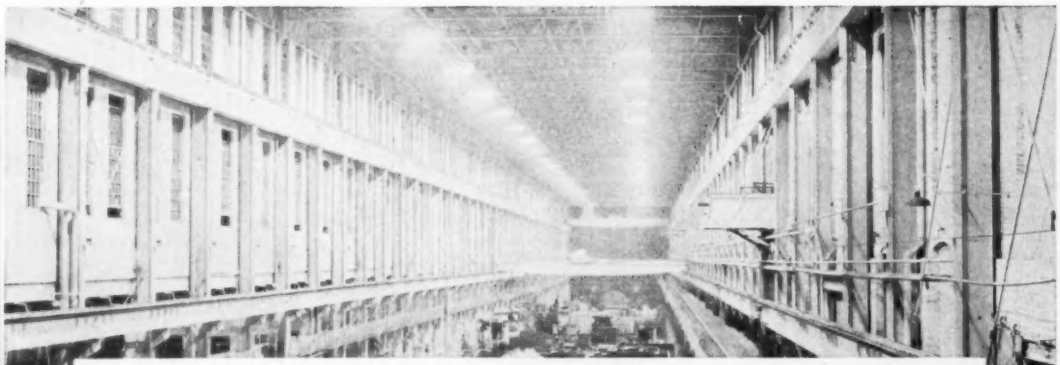
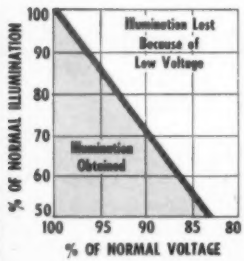
Allis-Chalmers

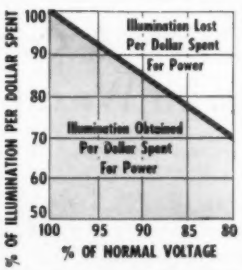
STOP Wasted



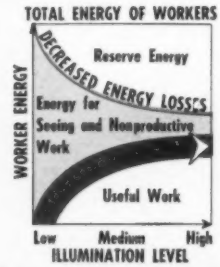
HOW UNDERVOLTAGE WASTES MAN-HOURS . . . CUTS PRODUCTION



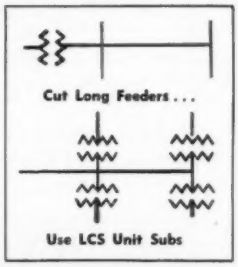
GOOD ILLUMINATION demands that rated voltage be maintained to all lighting fixtures. Illumination falls off rapidly on undervoltage . . . light output of filament bulbs is cut in half when voltage falls about 17%. Poor lighting causes eye strain . . . slows down workers . . . makes inspection difficult . . . causes increased scrap.



YOU PAY for illumination you don't get when you operate your distribution system at undervoltage. For example: at 10% undervoltage, illumination is cut 30% but power consumption is cut only 15%. Eliminate this power waste . . . get all the power you pay for by maintaining full voltage to all lighting fixtures.



MORE ENERGY AND TIME for useful work results from quicker seeing in well illuminated plants. In one case illumination was increased from 6 to 16 ft. candles (an increase from 83% to full voltage) . . . resulting in a 9% increase in production—20% decrease in accidents. Again, production increased 25% with an increase from 6.8 to 24.5 ft. candles.



A MAJOR CAUSE of undervoltage is the voltage drop in secondary feeders. Long lines of heavy copper carrying power at low voltage may prove inadequate as production schedules are stepped-up and new machines added. Install Allis-Chalmers LCS Substations at load centers to cut feeder length, reduce voltage drop and increase production.

Unit Substations

Manhours!

By Improving Illumination

BOTH MACHINERY AND PERSONNEL gain efficiency when you install unit substations to correct undervoltage. That's because no worker can do his best *unless* his job is well lighted . . . no electrical equipment gives top performance *unless* it operates at proper voltage.

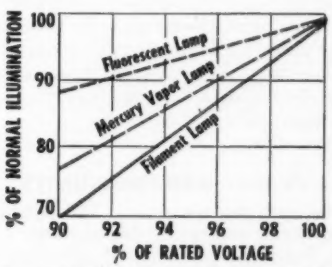
Filament bulbs, for instance, give 15% less than rated light when voltage falls only 5%. On undervoltage, fluorescent tubes and mercury lamps give less than rated light, are difficult to start, may flicker and go out. And when you operate at undervoltage, you are paying for power you're not using.

Eliminate power waste . . . manhour loss. Workers are more efficient, produce more work of better quality when illumination is adequate. Put *all* the power and manhours you're buying to work by maintaining proper voltage to all equipment. Install Allis-Chalmers LCS Unit Substations at load centers and eliminate long runs of expensive low voltage cable. Allis-Chalmers LCS Load Center Unit Substations are neat, compact, easy to install and provide protection to personnel.

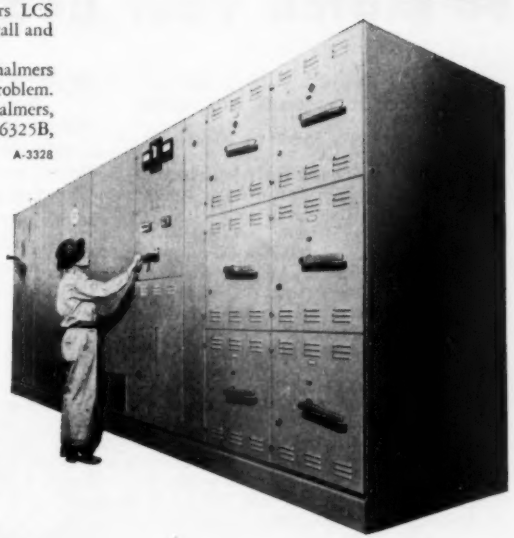
You can count on the cooperation of experienced Allis-Chalmers substation engineers in working out your distribution problem. Get in touch with your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for bulletins 11B6285A, 11B6325B, and 11B6895.

A-3328

LCS Unit Substations



Undervoltage reduces the light output of filament, fluorescent and mercury vapor lamps. Although light output is least affected on fluorescent lamps, undervoltage makes them flicker, hard to start. Mercury lamps go out altogether at 10% undervoltage . . . require up to 20 minutes to regain full light output.



ALLIS-CHALMERS

For more facts circle 509 on Reply Card

Built in Horizontal (illustrated), Vertical Delivery and Power Throw types — 47 different models.

Five popular sizes, A.G.A. approved for natural, mixed, manufactured, L.P. and L.P.-air gases.

Modine builds a unit heater to match your heating requirements

Whether it's steam, hot water or gas . . . look to Modine for the *right* unit heater

WHATEVER your unit heating requirements, you can match them exactly from the complete Modine line. Because Modine builds steam, hot water *and* gas-fired units, you're sure of an unbiased recommendation. And, remember, when you buy Modine, you buy the greatest name in unit heating. As a leader in this field for more than 25 years, Modine gives you balanced heating performance — perfect heating comfort plus maximum fuel economy. Get all the facts. See the Modine representative listed in your classified phone book, or write Modine Mfg. Co., 1563 DeKoven Ave., Racine, Wis.

Modine STEAM AND HOT WATER UNITS

Special heating coil designs for steam and for hot water assure best performance for each type of system. Discharge air temperatures of 110-120° F are correctly related to air velocity for heating at its best. All-copper coils defy corrosion because fins are bonded to tubes and tubes are brazed to headers. Pre-formed tubes with individual expansion bends absorb stresses, assure long life.

Modine GAS-FIRED UNITS

Modine is the only gas unit with both *stainless steel* heat exchanger and burner. Lighter weight means easier, less expensive installation, plus faster heat delivery — *within five seconds* after thermostat calls for it. Individually fired tubes provide higher heat transfer. Elongated ports — four times free area of conventional drilled ports — minimize clogging and simplify routine cleaning. U-1186

Ask for Bulletin 149-A on steam and hot water and Bulletin 652 on gas unit heaters

Modine UNIT HEATERS

For more facts circle 510 on Reply Card

PITT CHEM Tar Base Coatings

give you

better protection at lower cost

Above ground or below, you'll find Pitt Chem Tar Base Coatings ideal for preserving structural steel, tanks, underground piping, brick, masonry and stone surfaces. A single application of these economical, long-lasting coatings provides a film thickness equal to as much as *ten* coats of ordinary paint . . . and they stay on the job for *years* under conditions that usually cause ordinary paints to fail in *months*.

Pitt Chem Tar Base Coatings perform better on application and last longer because of their uniform top quality—a benefit that stems directly from our unique position as a basic and integrated producer of cold applied tar base coatings. We're able to carefully control every phase of production from coal to finished product—in a plant devoted exclusively to the manufacture of cold applied coatings. ● *We'll gladly provide more product information or technical assistance on request.*

PITT CHEM 101

A versatile, heavy duty coating that withstands severest corrosive conditions.

PITT CHEM 102

A thin, high gloss maintenance coating for steel and concrete surfaces.

PITT CHEM 103

A heavy duty coating for metal exposed to corrosive vapors, dilute acids and alkalis.

PITT CHEM 104

A fast drying, high gloss coating for equipment handling potable water.

WAD 4148

PROTECTIVE COATINGS DIVISION

PITTSBURGH
COKE & CHEMICAL CO.

Grant Building · Pittsburgh 19, Pa.

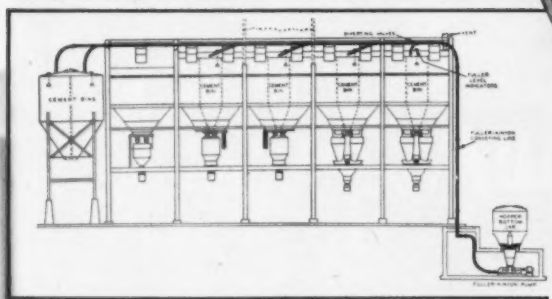
COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

For more facts circle 511 on Reply Card

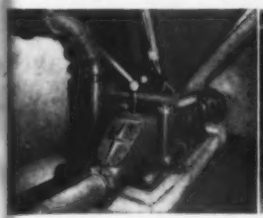
Step Right Up

for the facts on
DRY, PULVERIZED MATERIAL HANDLING
using the

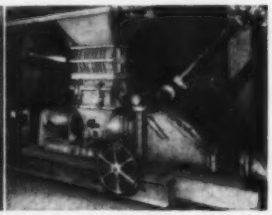
FULLER-KINYON
CONVEYING SYSTEM



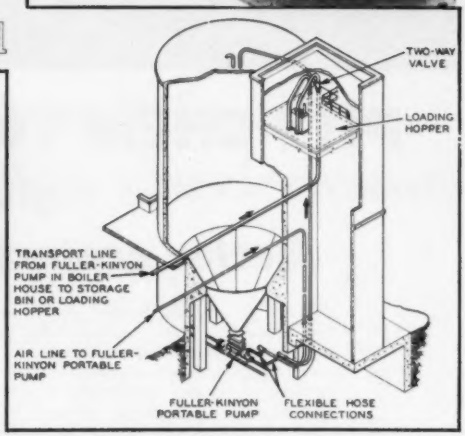
Unloading cement from hopper car; conveying to six delivery points



Fuller-Kinyon Stationary Pump conveying from bin to process equipment



Fuller-Kinyon Portable Pump conveying from silos to packer bins


TWO-WAY VALVE
LOADING HOPPER
TRANSPORT LINE FROM FULLER-KINYON PUMP IN BOILER HOUSE TO STORAGE BIN OR LOADING HOPPER
AIR LINE TO FULLER-KINYON PORTABLE PUMP
FULLER-KINYON PORTABLE PUMP
FLEXIBLE HOSE CONNECTIONS

Conveying fly ash from boiler house to storage bin; bin to car-loading hopper

There's an easy way to get all the facts you need to modernize outmoded and costly material-handling systems. Merely write today for specialized information on Fuller-Kinyon system applications.

Fuller Company has twenty-six years of specialized experience which has made preliminary engineering — for prospects and clients — *unnecessary*.

Where appropriate — a Fuller study is furnished with a comprehensive layout — *including estimates*. It will establish how your new system can be effectively arranged to utilize your existing plant facilities economically.

So . . . "Step Right Up" . . . while your new system is just a thought. You'll get the facts about pneumatic handling of dry, pulverized, crushed and granular materials — at no expense or obligation. Write today for this helpful assistance.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS
COMPRESSORS AND VACUUM PUMPS
FEEDERS, AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St.—Chicago 3
420 Chancery Bldg.—San Francisco 4

For more facts circle 512 on Reply Card

Better gear protection

*when you need it!**

—GULF E. P. LUBRICANTS

With Gulf E.P. Lubricants you get extra protection against gear troubles when production demands put unusually heavy loads on equipment. They are specially compounded to prevent metal-to-metal contact and help protect against pitting, spalling, and excessive wear.

For specific recommendations for your equipment, call in a Gulf Sales Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company
Pittsburgh 30, Pa.

GULF INDUSTRIAL LUBRICATION

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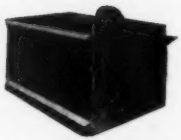
WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.



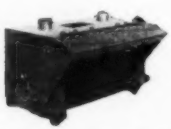
Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.

Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.

Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.

Drop Bottom Pressed Steel Type for lighter service.

Universal Type built up to 12 cu. yd. capacity with top and end doors.



Five cu. yd. container with swivel casters for handling waste blast sand.

DEMPSTER BROTHERS - 1112 Shea Building - Knoxville 17, Tennessee

For more facts circle 514 on Reply Card

Remember—the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.

Engineered for extra strength

An important value you get with TUBE-TURN Welding Fittings and Flanges is extra strength . . . at no extra cost.

For example, this TUBE-TURN Welding Tee will withstand more pressure than required by standard codes . . . because it is drawn from seamless tubing to a barrel shape, and because of its generous crotch radius and thickness. Bursting pressures obtained in tests of representative fittings have averaged more than 25% higher than code requirements.

For this extra quality get in touch with your nearby TUBE TURNS' Distributor. You'll find one in every principal city.

Scrappy says: "Aid defense—more scrap today . . . more steel tomorrow."

Write Dept. D-11 for free booklet on Allowable Working Pressures. Use coupon on reverse side.

Be sure you see the double "tt"

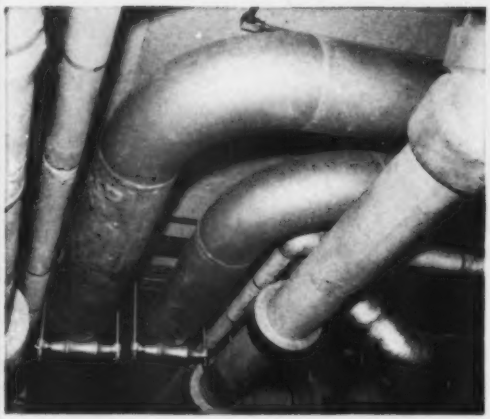
TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Houston • Tulsa • San Francisco • Los Angeles
TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO . . . A wholly owned subsidiary of TUBE TURNS, INC.

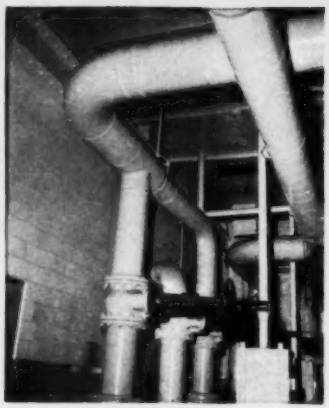
Welded piping system serves New York Stock Exchange

Long the financial capital of the world, the New York Stock Exchange was one of the first commercial buildings to have controlled atmosphere. Recent additions provide efficient, modern air conditioning to keep the financial mart comfortable at all times.

New installations have been made with a minimum of fuss, in limited space, by use of compact welded piping systems. With TUBE-TURN Welding Fittings used to make directional changes, a permanently leakproof system is assured.



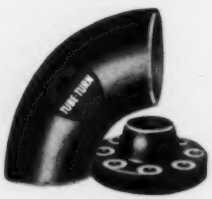
Use of welded piping simplified installation in cramped quarters. Welded lines can be fitted closely together, make a neat installation. Welders like to use TUBE-TURN Welding Fittings, because their consistent dimensional accuracy makes line-up easy, particularly important where space is at a premium.



These 10" and 14" lines carry condenser water to the building's cooling tower. Selection of TUBE-TURN Welding Fittings assures optimum flow conditions, and provides a permanently leakproof system.

TUBE TURNS, INC., Dept. D-11
224 East Broadway, Louisville 1, Kentucky

Your name .....
Position .....
Company .....
Nature of business .....
Address .....
City ..... *State* .....



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"tt" and "TUBE-TURN" Reg. U. S. Pat. Off.

TUBE TURNS, INC.

LOUISVILLE 1, KENTUCKY

You'll find them only in the

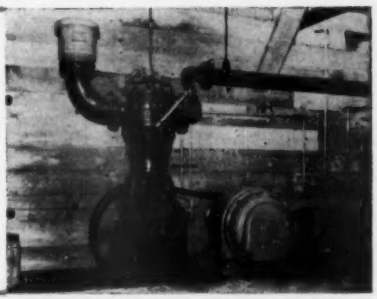
JOY WG-9 COMPRESSOR

These Exclusive Features are worth Money to you!

Only the JOY WG-9, in its class, offers replaceable crosshead guides and cylinder liners, and full force-feed lubrication—features that will save you money in operating and maintenance costs. Unique truncated pistons and angled over-size "Dual-Cushion" valves assure higher valve capacity, better heat dissipation, lower air friction and elimination of valve pounding.

The WG-9 is a water cooled, double acting, single stage, heavy duty compressor for use where medium amounts of air are needed or for supplementary service in high air-requirement industries. Vertical design minimizes vibration and cuts required floor space. Foundation is but a simple concrete pad.

15 SIZES • 30 to 150 lbs. psi • 172 to 881 CFM



JOY COMPRESSORS Meet any Need

High and low pressure compressors, oil free compressors, boosters and vacuum pumps—Joy builds a type and size for every need. • Let us handle *your* air-supply job.

Consult a Joy Engineer

Over 100 Years of Engineering Leadership

WSD 1 4030

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

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LIKE AN
ATOM-IC
EXPLOSION
Just 1/32" (pinhole size) faucet leak
MUSHROOMS into ATOMIC WASTE
of approximately 95,000 gallons •
of water yearly—costing:
$24.14
@ $1.90 per M cubic feet
If a hot water faucet, then (actual) FUEL WASTED heating 95,000 gallons costs approximately:
$88.91 if coal (9679 lbs.)†
$91.08 if oil (792 gals.)†
$84.41 if gas (84,411 cu. ft.)†
Above figures authenticated by Hackensack Water Co.* and American Gas Association.†
STOP this needless WASTE during today's MATERIAL and MANPOWER shortages with 'SEXAUER' "Easy-Tite" that outwear ordinary faucet washers 6-to-1, thus SAVING labor on 5 REPEAT repairs, PLUS water and fuel, while prolonging the life of SCARCE fixtures.
PAT'D.
" EASY-TITE "
FAUCET WASHERS
...a modern laboratory triumph, are compounded from du PONT NEOPRENE (tested up to 300°F.) instead of rubber—to withstand DESTRUCTIVE HEAT common in present-day superheating water systems — that formerly broke down washer's structure.
Built like a tire with fabric re-inforcement they resist the grinding, closing squeeze that SPLIT and MUSH ordinary washers out of shape... causing LEAKS.
Through combining NEOPRENE and FABRIC RE-INFORCEMENT they OUTWEAR ordinary washers 6-to-1 on hot or cold FAUCETS—thus you slash water, fuel and labor costs.
THE NEW 'SEXAUER' CATALOG
Edition G, just out, pictures over 2500 TRIPLE-WEAR plumbing REPAIR parts and Pat'd. Precision Tools. It's today's accepted buying guide for discriminating purchasing and maintenance personnel among thousands of top PLANTS, INSTITUTIONS and GOVT. AGENCIES that rely on SEXAUER repair materials. Send for your copy today!
Then too, there's a SEXAUER TECHNICIAN within quick call from coast-to-coast, who offers a special SURVEY service that sets up a schedule of the exact replacement parts required for your particular plumbing fixture regardless of make or age and without obligation.
A postcard will bring him and your NEW Catalog promptly.
J. A. SEXAUER MFG. CO., INC. Dept. B-112
2503-05 Third Avenue, New York 51.
as advertised in THE SATURDAY EVENING POST
SEXAUER
WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS
For more facts circle 517 on Reply Card

BACKTALK ABOUT PAST ISSUES

From Way Back When

PLANT ENGINEERING:

"Our engineer, J. G. Armstead, is very much interested in the 'PM Kit' shown on page 92 of the September, 1951, issue of PLANT ENGINEERING.

"If you still have some available, please send a kit along to us."

F. C. Huyck & Sons
Kenwood Mills — *G. L. Brown*

More on Fence Painting

PLANT ENGINEERING:

"The 'pour on' and 'brush on' fence painting articles in the February and April issues of PLANT ENGINEERING were of particular interest.

"I have been using the 'roller coater' method for about two years, which I find

These men are using the roller coater method for painting this wire fence

to be the most satisfactory and most economical. Special roller coater applicators are made for this purpose.

"I find this method very satisfactory also for painting interior partitions made of woven wire mesh, expanded metal, etc."

Stockham Valves & Fittings
E. C. Stewart
Superintendent of Construction

Permission Granted

PLANT ENGINEERING:

"In the August issue of PLANT ENGINEERING there is a short article starting on page 52 entitled 'Belt Shifter-Idler Combination.'

"I think that the device described by Mr. Bixler in this article might be of general interest and I am wondering therefore if I might have your permission to reproduce this article in one of the future issues of the *P.T.C. Bulletin*, with the understanding of course that if this permission is granted, both your paper and Mr. Bixler will receive the usual credit lines."

Power Transmission Council, Inc.
E. R. Rath
Executive Vice-President

Paging Circulation

PLANT ENGINEERING:

"The Safety Department at this plant is responsible for the establishment of standards on many different items and is therefore interested in all new developments in the engineering field.

"Occasionally we have the opportunity of seeing copies of PLANT ENGINEERING and have found both the articles and advertisements instructive and interesting. We would appreciate having our name added to your mailing list so that we can receive copies on a regular basis."

American Cyanamid Co.
Alan L. Kling
Safety Director

Machine Guards

PLANT ENGINEERING:

"I was greatly interested in reviewing the article on 'Permanently Welded Stainless Piping' in the September issue of PLANT ENGINEERING.

"I took particular notice of the illustration at the bottom of page 82 which showed the operator using a belt driven grinder. This brings to mind the fact that we had, at one time, a rather serious accident with a grinder of this type. Our company has an extremely detailed program on machine guards of all types and this particular type of grinder has a guard around the belt and sheaves."

American Can Company
Englewood Plant
S. J. Tozer
Chief Engineer

Yours for the Asking

PLANT ENGINEERING:

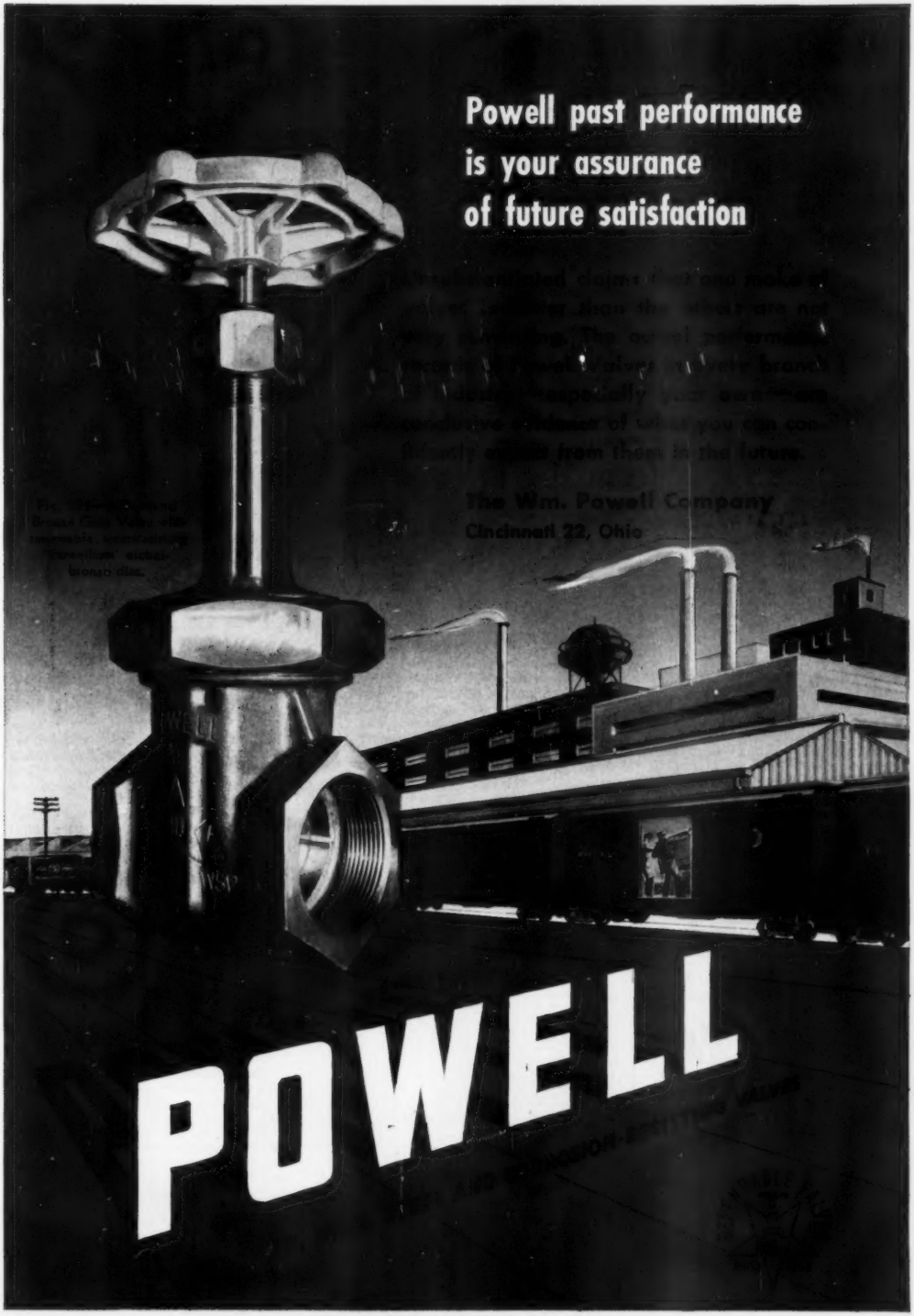
"I have read with interest the article entitled 'Acid Handling System Is Designed for Maximum Safety' by John Snedden, which appeared in the September, 1952, issue of PLANT ENGINEERING. I would appreciate receiving a reprint of this article if one is available."

Lion Oil Company — *H. W. Backes*

Piping Articles Get the Vote

PLANT ENGINEERING:

"Will you kindly send me a copy of the article appearing in the September, 1952, issue of PLANT ENGINEERING, entitled: 'Food, Dairy Plant Engineering



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AMERICAN MANUFACTURERS SPECIFY
Weld-Bilt
TRUCKS FOR OVERSEAS PLANTS

Leading American manufacturers have learned that Weld-Bilt Trucks are rugged and dependable under the most exacting conditions. In remote plants, where parts and service are hard to come by, Weld-Bilt Trucks can be counted on to stand up and deliver.

You can SEE the greater strength and durability in Weld-Bilt Equipment . . . in heavier arc-welded construction, in sturdier operating parts, in many innovations that assure easier, friction-free operation. Whether your plant is near or remote, Weld-Bilt Equipment will SAVE MONEY on both original cost and maintenance expense. Write today for catalog and details on the complete Weld-Bilt Line.

WEST BEND EQUIPMENT CORPORATION
MATERIALS HANDLING ENGINEERS

304 WATER ST. • WEST BEND, WIS.

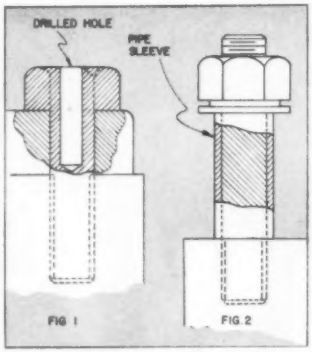
For more facts circle 519 on Reply Card

Easier with Permanently Welded Stainless Piping.' We are very interested in having this information."
The Carpenter Steel Co.
Alloy Tube Division
F. A. Guba, Manager
Market Res. and Dev.

PLANT ENGINEERING:
"We would appreciate very much if you will advise us of the availability of materials used for pipe patch as shown in article, 'Fibrous Glass, Tape and Chemicals Make Emergency Repairs to Pipe,' in August, 1952, issue of PLANT ENGINEERING.
"We have had some inquiries regarding the above process."
Bonne Terre Farming & Cattle Co.
O. S. McDaniel

Our Best Friend . . .

PLANT ENGINEERING:
"The recent item by Chester Smith in the July, 1952, issue of PLANT ENGINEERING, page 44, presented means for strengthening bolts by undercutting. It is a little simpler than the ideas presented below, but if the problem is severe enough, the use of either of these methods may be justified.
"The idea shown in Fig. 1 proved successful in one tough case. A hole is drilled down the center of the bolt, taking care to stop short of threaded portion. In determining size of drilled hole, the remaining cross section of upper portion of bolt should be less than area at root of thread. By drilling the bolt, the stress is distributed over an inch or so of the bolt instead of being concentrated at the root of the thread.
"A similar case occurred with a crusher where excessive vibration caused continual failure of studs. They broke off in the thread and had to be drilled out. A somewhat different approach had to be used. In this case 10 in. longer studs were used and pipe sleeves added as spacers under the nut, as shown in Fig. 2."
Chesman A. Lee



. . . And Severest Critic

PLANT ENGINEERING:
"This is with reference to the article 'Acid-Handling System Designed for Safety,' which appeared in the September, 1952 issue of PLANT ENGINEERING.
"An error in the drawing shows pipeline 'to bottom of tank car.' No-can-do, besides it is against the regulations. Bottom connection is only for wash-out.

BACK TALK

" 'A pop-off valve on the air tank guards against pressures in excess of 40 psi.' Air pressure should be limited to 30 psi. If not enough, a pump should be used with air as a booster and prime-pump over top of car." *Chesman A. Lee*

Shop Offices for Foremen

PLANT ENGINEERING:
"The problem of providing some sort of office space for our shop foremen has come up for discussion.
"We are reactivating our plant and will have heavy duty machining and welding fabricating shops. In thinking about this problem, we thought of your publication. The question that we would like some clarification on, is as follows:
"What is the latest thinking on supplying shop offices for foremen and what type are most suitable, if recommended?"
American Car and Foundry Company
C. F. Mitasik

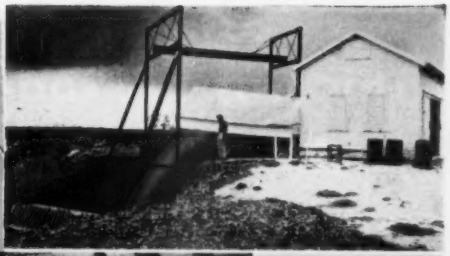
Editor's Note: It is really difficult for us to give you any information regarding the latest thinking of industrial plants regarding shop offices for foremen and other supervisory personnel.
We do know that in practically every plant we visit, particularly in the metal working industries, shop offices have been provided. In fact, we have published two articles on shop offices and tear sheets of these are enclosed. ("Build Economy and Efficiency into Shop Offices," appeared in August, 1950 issue, page 34; and "Shop Control Centers Can Be Clean, Cheap and Effective," appeared in the June, 1951 issue, page 70.)

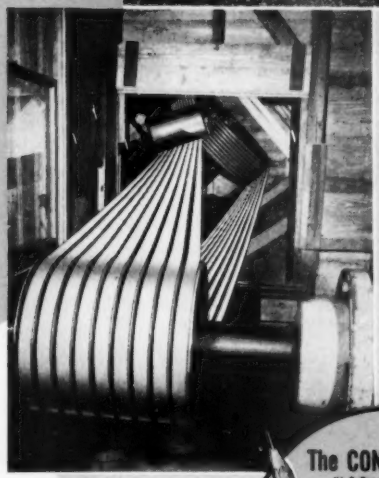
What About Filtering Air?

PLANT ENGINEERING:
"The stability of Fiberfrax (PLANT ENGINEERING, September 1952, page 90) in the presence of nitric acid, nitrogen oxides and water vapor at temperatures of approximately 400 C and in the presence of moisture of lower temperatures is of considerable interest. At present we find that glass filaments, used for filtering air at approximately 5 fpm linear velocity under the above conditions, are not sufficiently stable for our purpose.
"Any pertinent information you may have regarding the characteristics of this material would be of interest. An estimate as to when Fiberfrax may be available in filament form would also be greatly appreciated."
Nucleonics Dept. *R. G. Barnes*
General Electric *Process Engineer*

See for Yourself WHY

Gates Vulco Ropes Wear Longer





This big 80,000 GPM turbine pump lifts water against a 14 foot head from a drainage canal to Lake Hicpochee in the Diston Island Drainage District near Moore Haven, Fla. Driven by a diesel engine through a 9 D-Section Gates Vulco Rope Drive with a one-eighth turn, the pump drains 19,000 acres of land for sugar cane and cattle raising.

Make this Simple Test

Take any V-belt that has *straight* sides. Bend that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the full face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

When you buy V-belts, be sure to get the V-belt with the Concave Sides--the Gates Vulco Rope!

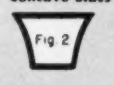
Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

What Happens When a V-Belt Bends

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

Gates Vulco Rope with Concave Sides



The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley — Uniform Wear — Longer Life!

CS-528-A

Gates VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

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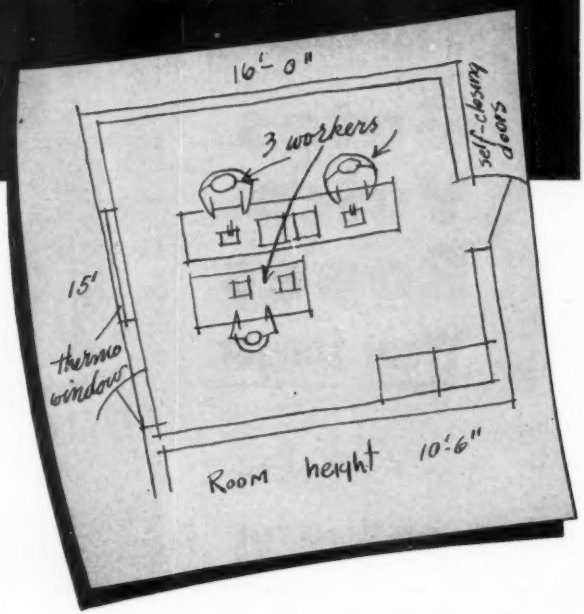
This was Lectrodryer's proposal for keeping a workroom DRY



the Problem:

A room 16' x 15' x 10½' is to be held at 20% to 25% relative humidity at a dry bulb temperature of 85° F.

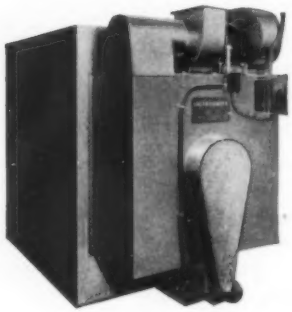
Three people will work in this area.

Materials processed give off no moisture.

Loss of air from the room will be small.

the Solution:

The Type CHG air-conditioning Lectrodryer*, capable of delivering 350 cfm of DRY air at 15° above temperature of the cooling water, with reactivation heat supplied by fuel gas, electricity or 110 psig. steam.



Lectrodryer engineers tell you exactly what equipment you'll need for dehumidifying an area, as they did in the actual case cited above. And, in addition, they advise on methods of sealing openings and walls against the intrusion of moisture—so necessary to hold down your operating costs.

Lectrodryers come to you fully assembled. You have only to connect up supply lines and ducts, and they're ready for work. If you'll tell us your humidity problem, we'll recommend a solution. Pittsburgh Lectrodryer Corporation, 333 32nd St., Pittsburgh 30, Pennsylvania.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sydney.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Brossoux-Liege.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

*REGISTERED TRADEMARK U.S. PAT. OFF.

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Cuts everything from carbon steel to asbestos

DELTA 14-inch BAND SAW

Delta 14" Metal Cutting Band Saw.

This precision tool pays for itself by its wide range of operations, its lifetime accuracy under heavy duty operation and its extremely low maintenance cost.

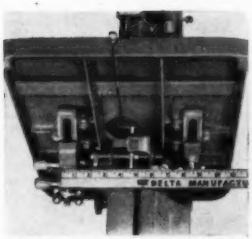
Follow any pattern in wood, plastics or metals—make true, precision forming cuts with this Delta band saw. Save time—speed production as well—cut a dozen or a hundred forms at once, depending on size.

Straight ripping, too, is done easily — the rip fence has microset adjustment. Special blades are available for cutting metals, plastics, aluminum, magnesium, and similar materials. The sanding attachment opens a whole new field of usefulness.

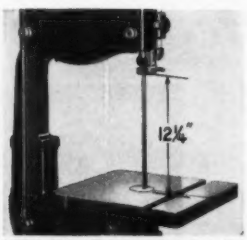
There's a Delta band saw to do your job. Choose from 3 models—14", 20", or 36".

Change from metal to wood with just a flip of your finger and simple belt change.

Simple, substantial gear drive. Metal-cutting speeds: 125, 175, 250, 340, f.p.m. Woodworking speed: 2200 f.p.m.



Ribbed, rigid table, 14" x 14", supported by two massive trunnions, 9" apart.



With height adjustment, height under guide is variable from 6¼" to 12¼".

Micrometer adjustments of blade guides support blade for accurate work. Guides and blade supports adjust independently.

For added convenience and increased efficiency, upper wheel has blade tension adjustment. Quick index shows correct tension for various widths of blades.

For Delta dealers, see your Classified Phone Directory under "Tools"

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES • 246 MODELS • MORE THAN 1300 ACCESSORIES

Another Product

MILWAUKEE

DELTA POWER TOOL DIVISION

Rockwell

MANUFACTURING COMPANY

602M N. Lexington Avenue, Pittsburgh 8, Pennsylvania

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THE INVISIBLE TOOL

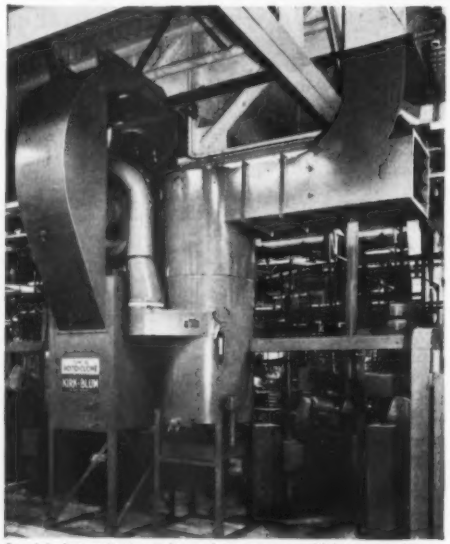
at work in the

FORD AUTOMATIC TRANSMISSION PLANT

NUMBER 5 OF A SERIES

KIRK AND BLUM SYSTEMS

COLLECT DUST and CHIPS in MACHINING



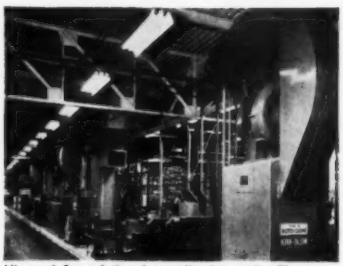
Special dust collector unit used on many machining operations. Heavier particles from various grinding, drilling, tapping and finishing operations are separated centrifugally. Fine particles are trapped in the oil bath cleaner.

Metal dusts, in precision manufacturing, must be collected as formed, preventing damage to parts and equipment, making highest accuracy possible.

In the extensive tool grinding department of this plant, a single KIRK & BLUM system exhausts scores of machines. In the machining area alone, Kirk & Blum installed 12 dust control units which provide efficient collection for hundreds of machining operations.

In the ultra-modern Ford Motor Company Automatic Transmission Plant, 37 distinct KIRK & BLUM Systems aid in the production of Merc-o-Matic and Ford-o-Matic transmissions. In heat treating, quenching, welding, cleaning, machining, woodworking, maintenance and assembly operations, they provide "Clean Air . . . the INVISIBLE Tool" in this model plant.

Let the 45 years' experience of KIRK & BLUM work for you. Write for literature and detailed information. The Kirk & Blum Manufacturing Company, 3189 Forrer Street, Cincinnati 9, Ohio.



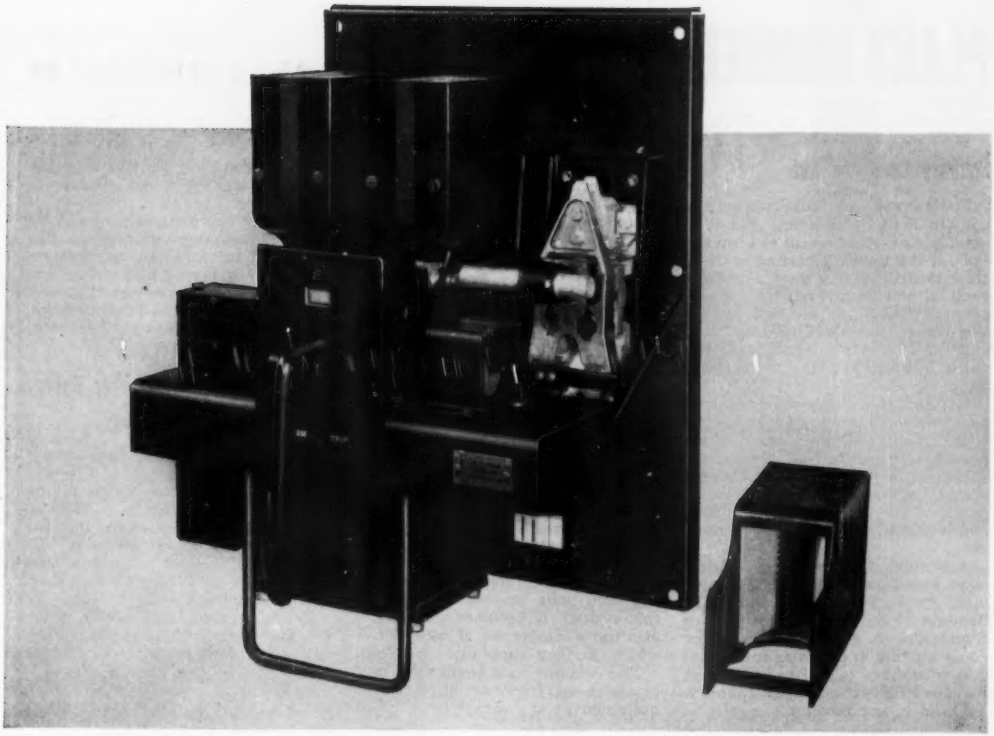
View of five of the dust collecting units. There are 12 of these in the cast iron machining section of the plant. Note that cleaned air may be returned to the room or discharged outside the plant.

View of tool grinding department in this Ford plant. Each machine is individually exhausted, dust particles carried to a separator in which the dust is trapped in oil and removed in the form of a sludge.

KIRK AND BLUM

DUST CONTROL SYSTEMS

For more facts circle 523 on Reply Card



Here's *FLEXIBLE* protection in a sturdy, functional design!

DB Circuit Breakers, which offer a wide range of tripping characteristics for flexibility of application, also provide benefits of a functional design. Look how these construction features minimize and facilitate maintenance . . . provide for long-operating life.

All-metal mounting base . . . provides a strong, rigid foundation for all parts.

De-Ion® arc interruption . . . provides for quick arc extinction . . . longer contact life.

Subassemblies easily removed as a unit . . . and auxiliary attachments easily added without drilling. Inspection or replacement is simpler, too.

Complete shielding of live parts . . . assures safety of operating personnel.

Overcurrent tripping device . . . is easily adjusted to provide the basic delay characteristics for general circuit protection. Other tripping devices are also available for selective tripping application.

For additional information write for Booklets B-4067 and B-4740 Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60788

YOU CAN BE SURE...IF IT'S Westinghouse

"DE-ION" CIRCUIT BREAKERS TYPE DB

DESIGN TESTED AND VERIFIED in the Westinghouse HIGH POWER LABORATORY

WESTINGHOUSE

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PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by E. B. Skubik

Foundry Core Box Set

MANY TYPES of foundry castings contain cylindrical holes, and it is usually more economical to form the hole at the time the casting is made than to drill it afterward. To form such a hole, a cylindrical core is properly located in the mold before the casting is poured. These cores consist largely of sand and are easily knocked out after the castings have cooled.

Hollow boxes of suitable dimensions are used to form the necessary cores. Many different cores are required for the variety of castings called for in foundry practice, and a correspondingly large number of cylindrical core boxes are acquired and accumulated by many foundries.

A simplified system of cylindrical core boxes has recently been devised by R. H. Harwell and J. H. Schaum of the National Bureau of Standards. A set of 14 boxes, for cores ranging in diameter from ⅜ to 2 in. in steps of ⅛ in. has been made for the NBS experimental foundry.

There is one box for each diameter core, and the length of each box has been fixed at the maximum likely to be required for a core of that diameter, as shown by experience. Shorter cores can be cut from full length units, or can be made by placing cylindrical pieces of wood of the proper length in the core-box cavity. When a core with a tapered end is required, a brass insert having a standardized taper is placed in the core box.

Each insert is 1/32 in. smaller in diameter than the core box with which it is used, to facilitate placing it at the bottom of the box prior to ramming the sand.

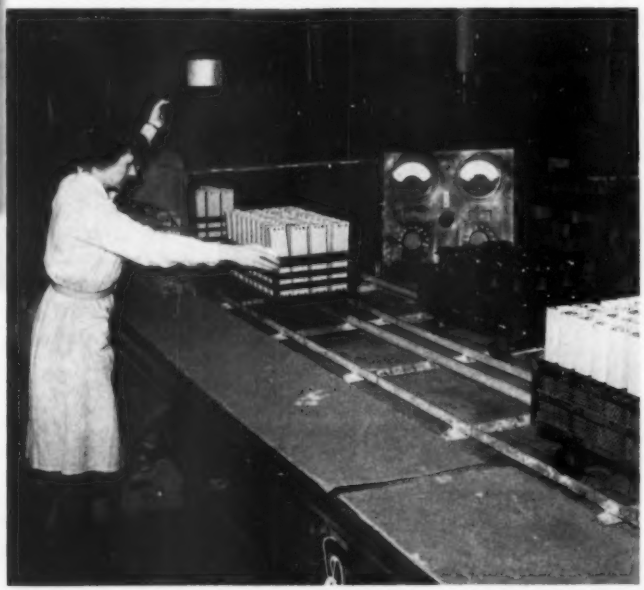
Tapers were standardized at 15 deg, instead of the wide variety of tapers encountered in common practice. A standard vertical length for the tapered insert was also adopted for each core diameter.

Because taper and core length of the core ends are standardized in this system, it becomes possible to also use a master set of core prints, which further simplifies operation.

The versatile core boxes take care of the great majority of core requirements at the experimental foundry, largely eliminating the need for making special boxes for new jobs.

Foundry operation is thus simplified and made more economical. Because of its inherent advantages, other foundries may find this system useful, with or without modification. *From NBS Technical News Bulletin, published by the National Bureau of Standards, Washington, D. C.*

Handling System Using Small Carriers Saves Working Time



This small scale method of material handling is being successfully used by a British firm. Parts are loaded on these miniature railway cars prior to being pushed into the oven. This system saves about 5 hours working time a day. (From Target, published by British Information Services, New York 2, N. Y.)

Watch Centers and Center Holes For Accuracy in Grinding

THERE HAS been a saying for years that you cannot grind any better than your center holes. This saying was credited to Charles H. Norton, the original designer of the modern cylindrical grinding machine. To this saying should be added that you cannot grind any better than your centers and center holes.

Faulty centers and center holes are the cause of more spoilage than any other factor, with the exception, of course, of the human element. Complaints of operators that a machine will not hold size are in many cases due to faulty centers or center holes.

As an example, an operator was unable to duplicate sizes and straightness. Investigation showed that the pieces to be ground were not centered evenly — some center holes were deeper than others. Regrinding centers remedied this situation.

The reason for this should be apparent to all operators of cylindrical grinding machines. A footstock center is usually a so-called half center cut back so that small diameters can be ground. This center is always inserted in the footstock with the flat or relief toward the wheel.

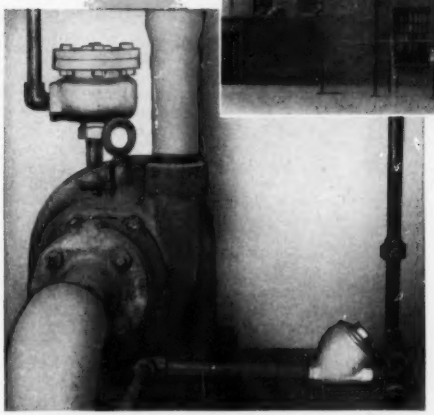
Due to wheel pressure, this center will wear more on the wheel side. The wear may be very slight, not even noticeable. If it is only 0.0001 in. it would cause an error of twice that amount in size and straightness if some pieces ground had larger holes than others. The bearing in the large center hole then would be on the part of center that had not received any wear.

Pieces that have to be reversed end for end will not be concentric unless both centers are ground with the same angle on the point.

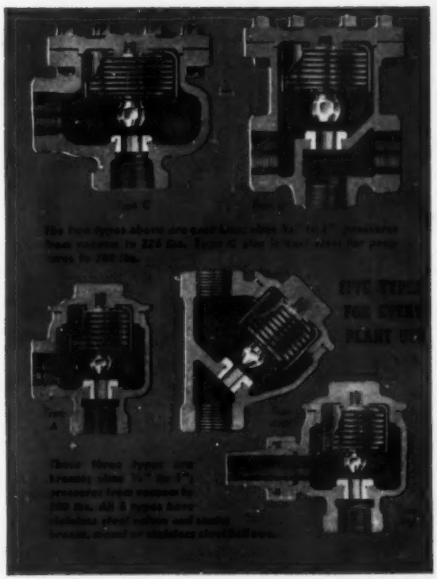
In the process of finish grinding of heavy parts such as wheel spindles, these parts often remain in a machine for a long period before completion. For this operation, it is essential to have correctly lapped

(Please turn page)

NICHOLSON TRAPS SELECTED FOR *Celanese* STEAM PLANT



Above, enlarged steam generating facilities of the Celanese Corporation of America plant at Hopewell, Va., now in an extensive expansion program. Specified were Nicholson Steam Traps, two of which are shown at left.



How to use modern equipment to bring the steam generating capacity of a boilerhouse up to the needs of an extensive plant expansion program was recently demonstrated by Celanese Corporation of America at its Hopewell, Va., textile plant.

Stoker equipment to fit present space, and auxiliary equipment of the most modern nature -- all were selected with a view to attaining maximum efficiency, and desired capacity with a margin of space for further expansion. Nicholson Steam Traps were installed in connection with a new piping system which features return of the condensate and reclamation of most of its heat.

A recent survey showed these Nicholson features to be reasons why an increasing number of leading plants are standardizing on Nicholson thermostatic traps: 2 to 6 times average drainage capacity; shorten heat-up time. Operate at lower temperature differential; fast action keeps equipment full of live steam. Maximum air-venting capacity. Types for every process, power and heat application.

Send for
CATALOG 751

A 32-page standard reference; contains installation diagrams and data for determining proper size of trap.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

208 OREGON ST., WILKES-BARRE, PA.

Sales and Engineering Offices in 53 Principal Cities

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PLANT ENGINEERS' DIGEST

center holes and correctly ground centers.

If center holes are lapped as required, 60 deg + 0, and centers are ground as usually specified 60 deg + 0, it would take only a few revolutions of pieces thus mounted in the machine to exhaust all lubrication in center holes and quickly score centers or center holes.

The writer has ground centers for this type of work for over 16 yr at a greater angle than 60 deg (estimated angle) about 60 deg + 11 to 13 min. The advantages of this ought to be clear. The bearing in the center holes is heaviest at the largest diameter of the hole, and gradually diminishes toward the point of the center. It not only takes care of a slight error in lapped center holes, but the difference allows a storage of lubrication and keeps centers lubricated. *From an article by J. E. Johnson in Grits and Grinds, published by Norton Co., Worcester, Massachusetts.*

Sand Slinging Broncho

A MOTIVE SPEEDSLINGER is a fascinating piece of equipment that is used at the Grantley foundry belonging to the York Corporation of York, Pa. This machine rams sand mixtures into different size flasks.

The operator requires approximately 1½ yr to learn to operate the sandslinger efficiently. He actually rides with the machine and controls its actions by merely pushing buttons. From his seat on the delivery arm which he can move up and down, backwards, forwards or sideways, the operator can ram sand into a flask at a speed of 176 fps.

The sand gets its speed as it is emptied into a bucket which is being revolved on an arm at 1,800 rpm. A spotlight shines on the area being rammed because at this speed the sand isn't even visible.

One man riding this industrial broncho can deliver a ton of sand per minute. This is approximately 15 times faster than it could be rammed by hand. Another advantage is that it produces a harder and more uniform mold and permits use of greater variety of sand mixtures.

The machine is basically a truck on wheels operated by a 60 hp motor. It holds a 20-ton hopper, a screen for the sand as it is delivered from the hopper and an elevator to get the sand up to the delivery arm and the slinging mechanism for delivering sand into the mold. *From Shop News, published by York Corporation, York, Pa.*

Machine slings sand so fast that operator needs spotlight to watch flask

Huge Tank Moved Through Wall

For want of clearance, a section of building wall had to be taken out to permit moving of this large tank. There were about 7 tons of carbon in the 22-ton tank when it was moved by the two cranes and placed on a transport truck. (From The Wingfoot Clan, published by the Goodyear Tire and Rubber Co., Inc.)

Steam Return Line Corrosion

CORROSION in return lines is at times so gradual as to cause no particular concern. It may involve only occasional replacement of fittings or a section of piping. At other times corrosion is so rapid and dramatic as to be of great concern and cost.

Corrosion is normally caused by dissolved carbon dioxide and/or oxygen in the system. Mixtures of the two gases are considerably more corrosive than either one alone.

Oxygen commonly causes serious localized corrosion at points where dissimilar metals are in contact, where there are stresses in piping or where other corrosion producing conditions exist. Oxygen-accelerated corrosion is usually identifiable as a pitted condition. Removal of the oxygen may reduce the corrosive action to a minimum of importance.

Oxygen is not only carried into the system dissolved in the feedwater but also enters through leaks in vacuum return lines and openings to the atmosphere.

The preventives for corrosion due to oxygen and carbon dioxide are many and varied. They include deareating feedwater heaters, vents and chemical treatment. Several water treatment companies advertise adsorption and neutralizing treatments that successfully combat the problem. *From Armstrong Trap Magazine, published by the Armstrong Machine Works, Three Rivers, Michigan.*

Winterize Your Fire System

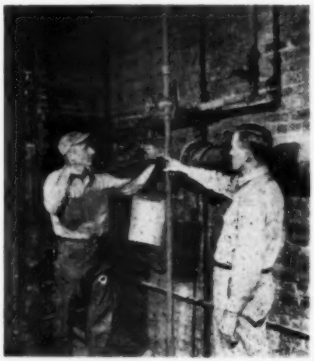
THE APPROACH of cold weather automatically requires that well established preparations be made to assure complete sprinkler protection. Water facilities, the life blood of a sprinkler system, are intended to stand ready to serve at the instant fire starts. They must be regularly checked and serviced to obtain their full benefit.

A frozen sprinkler system or sprinkler supply means not only the removal of the most effective mechanism, devised by man to stop a fire in its early stage, but also presents a situation where actual damage can be done to the part or parts neglected.

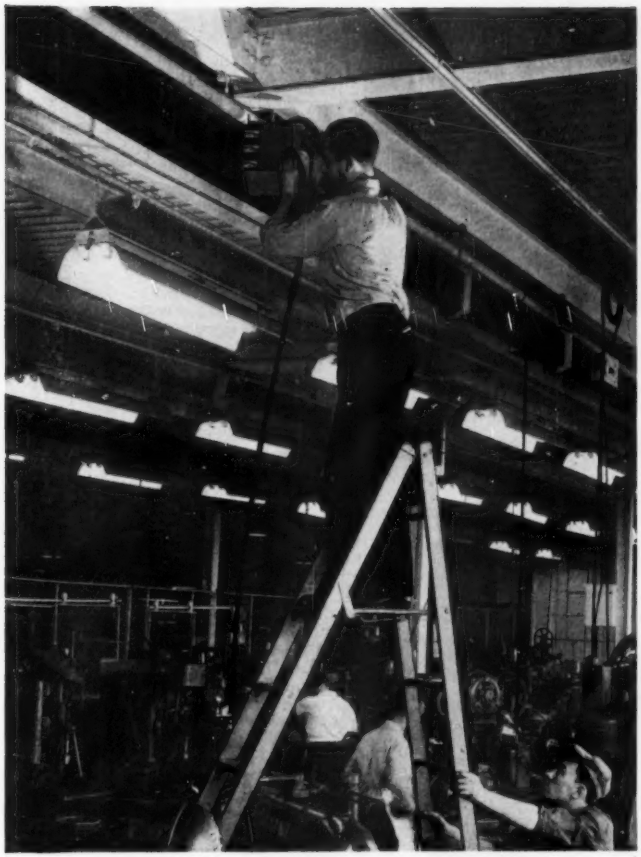
A corroded or neglected tank heater—or one of inadequate capacity—generally results in a frozen water supply and exposes the plant to a possible fire.

Lack of preparation of hydrants, inadequate building heat, neglect in draining low points of sprinkler systems in unheated areas are but a few of the necessary precautions which must be observed to keep the sprinkler system in operating condition.

Freeze-ups are costly experiences,



Preventive operations such as this are good insurance against winter freeze-up

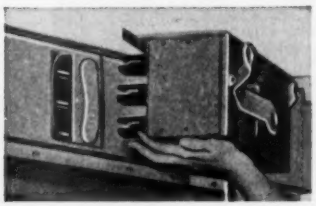


Machines may be installed or moved without rewiring or power shutdown. Machine is simply positioned, then tapped into *live power* by inserting protective plug into convenient opening in BUStribution DUCT.

Tap live power anywhere along BUStribution DUCT.

1. Choose location in duct.

Duct has regularly spaced, crescent-shaped openings on *both sides*, on average 10" centers. This permits spacing of plugs close to machine locations; gives better current density distribution on bus bars; obtains uniform and better heat dissipation between bus bars and casing. Plug-In openings are covered by embossed plates swiveled to casing on rivets which permit covers to be rotated through 180 degrees.



2. Connect machine and engage Bus Plug.

Crescent shape of Plug-In openings assures proper polarization of the Plug-In devices. Plug contact fingers are staggered so that plug may be inserted in openings in only one way. The steel side channels of the plug provide a means of grounding for greater safety, and supply support until plugs are bolted to duct. Bus bars and plugs' current-carrying parts are silvered, assuring perfect connections.

No costly down-time with BullDog Plug-In BUStribution!

Install or move machines anywhere, any time, without shutting off power. Simply pull plug that supplies power to machine from duct; move machine; plug in at new location. Connections between machines and duct runs are made easily, rapidly. No current outages. *No disruption of production schedules!*

With BUStribution DUCT systems, original installations are faster and more economical. Parts are factory-built, flexible, easy-to-handle units that are delivered ready to install. No cutting, threading, bending of material is necessary on the job. Long, heavy cable and conduit home runs are eliminated, along with time-consuming fishing and pulling in of bulky cables.

For unlimited leeway in machine distribution and plant layout changes, get Plug-In BUStribution DUCT. Call in a BullDog Field Engineer, or write BullDog direct for free, comprehensive Bulletin B-755.

BULLDOG

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IT'S GRATIFYING

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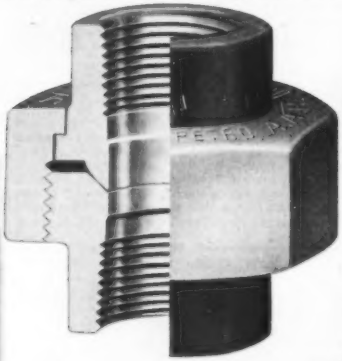

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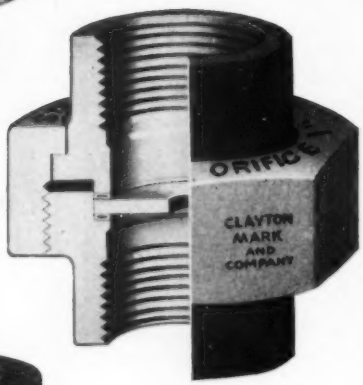

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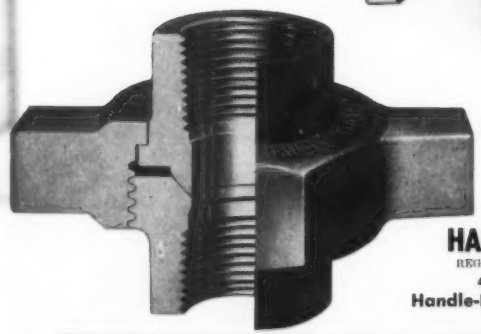

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

and entirely unnecessary. A few dollars spent in preparation and prevention may not only save hundreds of dollars in repairs, but may save your plant if fire should occur.

Here are some questions to help you check the condition of your fire protection system: 1. Does your gravity tank heater need cleaning? 2. Is your gravity tank riser insulation in questionable condition? 3. Do you have a reliable automatically controlled electric strip heater for your dry valve enclosure? 4. Is anti-freeze solution in system of proper concentration? 5. Are low points in a system drained? 6. Do all hydrants shut off completely and drain properly? *From Sentinel, published by Factory Insurance Association, Hartford, Conn.*

Material for Pump Construction

THE SELECTION of pump construction material depends entirely on the nature of the liquid to be handled and the conditions applying to each particular installation. The main items for consideration are corrosive and abrasive properties of the liquid and its temperature.

The corrosion problem can be broken down into two classes: 1. The selection of a material to be used in the pump construction and the piping system which will resist the corrosive action of the liquid, the degree of concentration of the liquid, and whether the system is closed or is subject to atmospheric oxygen. 2. The selection of a material which will not contaminate the liquid. In many instances, the contamination of the product being pumped is the main point considered in the selection of materials for the entire installation.

The rotary pump is not too well suited for handling liquids containing abrasive materials. In some instances, the rotary pump must be used because a positive displacement is needed. In other instances, the relatively lower cost of the rotary pump is the determining factor.

Extra life can be added to a pump handling abrasive liquids by: 1. Using a larger pump operating at a reduced speed; 2. Using extra large piping to reduce the total discharge head; and 3. Furnishing special hardened parts which offer resistance to the abrasive actions.

The temperature of the liquid to be pumped also enters into the selection of materials for pump construction. Up to 300 F, usually a standard pump given additional

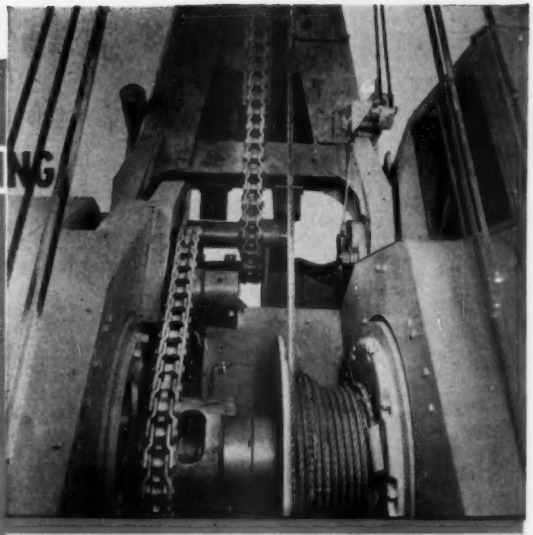
(Continued on page 40)

just a few Jeffrey products . . .

FOR IMPROVING HANDLING AND PROCESSING

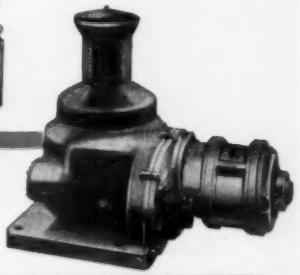
Space does not permit a complete showing of all the products in the broad Jeffrey line. A few are displayed here to give you an idea — our NEW Catalog No. 418 goes into more detail. It will prove a handy reference if you are interested in improving handling, processing and reducing operations in your plant. Send for your copy TODAY.

BUCKET ELEVATORS—standardized to save you time and money. A type and size, buckets mounted on belt or chain, to give your material a lift . . . to keep production moving in a way that spells more profit for you.



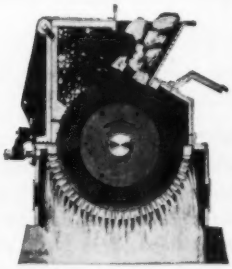
Above: A complete line of Chains and Transmission Machinery . . . bearings, idlers, traction wheels, take-ups, sprockets, gears, hub boxes, couplings, etc.

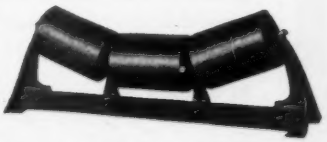
Below: Jeffrey-Traylor Barrel Packer. Cuts shipping costs—reduces size of container as well as increases its capacity. Also electric vibrating Packing Tables, Feeders, Conveyors, Dryers and Coolers.



CAR PULLERS—two sizes for moving from one to six cars. Save time and expense. No locomotive needed.

PULVERIZERS AND CRUSHERS—Rigid or swing hammer, single or double roll, FLEXTOOTH or Rotary Ring types to provide uniform reduction with a minimum of fines. Reduce coal, limestone, gypsum, pulp lap, garbage, metal turnings, alum, chips, sewage screenings, sugar cane, to desired fineness the Jeffrey way.





BELT IDLERS—furnished in both troughing and flat belt types for belt widths from 14" to 60". Idlers are of the anti-friction type, insuring low power cost and smooth performance.

THE JEFFREY MANUFACTURING COMPANY

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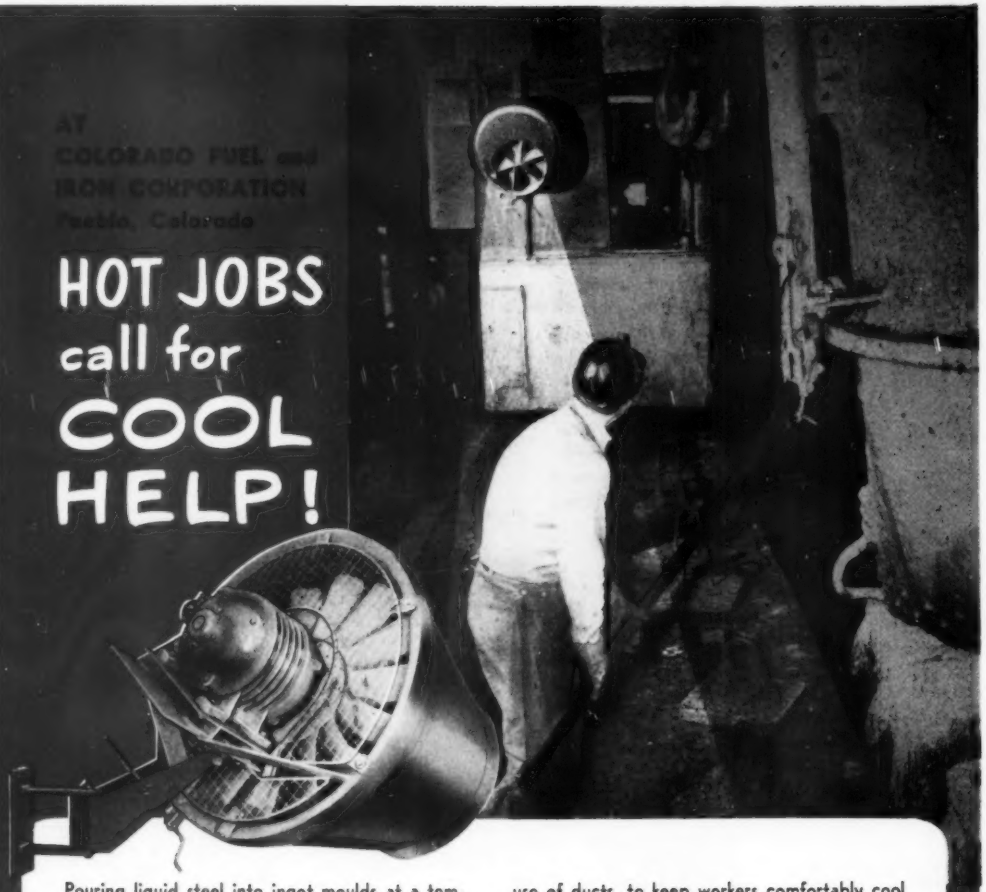

Pouring liquid steel into ingot moulds at a temperature of 2800° F. is a hot job that demands skill and constant attention. When workmen are exposed to such intense heat, thermotic fatigue can be a real problem.

At Colorado Fuel and Iron Corporation's mill in Pueblo, Colorado, they solved the problem by mounting a DeBothezat "Hy-V" Air Jet on the cab of the crane which handles the ladle, so that the fan unit travels right with the men as they work. "Hy-V" Air Jets project a concentrated stream of fresh air as far as 35 feet, without the use of ducts, to keep workers comfortably cool, alert and efficient.

DeBOTHEZAT "HY-V" AIR JET is a 14-blade axial-flow pressure fan in a nozzle-shaped housing. It can be furnished with a bracket for wall installation or it can be mounted on a portable wheeled stand. Both types are available with fan wheels from 18" to 30" in diameter, with capacities up to 12,000 CFM.

Ask your DeBothezat Fans representative or write the factory today for a bulletin on "Hy-V" Air Jets. Address Dept. PE1152.

DeBothezat Fans

Division of American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

For more facts circle 529 on Reply Card

BULLETINS just released and of immediate plant interest

MECHANICAL POWER TRANSMISSION

101 Data on Speed Reducers—Twenty-pp Bulletin A-814-A offers in compact form full engineering information and selection data on manufacturer's line of Torque-Arm speed reducers and a new overload release designed for use with the reducers. Data and tables have been revised to include a new reducer which increases the capacity range to 43 hp. This line of shaft-mounted reducers covers a speed range of 12 to 330 rpm. A quick method of selection is presented. Dodge Mfg. Corp.

102 Right-Angle Gear Motors—Description of new line of right angle gear motors is subject of 8-pp Form 1650 on Type GW Syncrogear motors. Complete cutaway drawings in color illustrate construction details. One page pictures the various styles available, in vertical, horizontal, and flange mountings, and in single and 3-phase windings. U. S. Electrical Motors, Inc.

103 High Speed Reduction Gears—Built-in or coupled reduction gears for mechanical turbines are presented in 8-pp Bulletin H-19. Construction details of both types are shown, and design and material specifications included. Also provided are an application guide chart, and dimensional data. Elliott Co.

104 Hydraulic Cylinders—Bulletin H-104G, 8 pp, provides engineering, design, construction, mounting and dimensional data covering a line of space-saving square-design hydraulic cylinders for 2000-3000 psi operation. Arranged for easy selection of model and size, this bulletin covers 13 mounting styles in 1½- through 12-in. bores. Miller Motor Co.

105 Bearing Lubrication Tips—Everyday problems of bearing lubrication and maintenance are treated in 8-pp Form 426. Although dealing specifically with manufacturer's own bearings, contains practical general information on reasons for lubrication, factors involved in choice of oil or grease, correct use of both types of lubricants. The Fafnir Bearing Co.

106 Hydraulic Cylinders—Bulletin 701, 22 pp, provides engineering and descriptive data on manufacturer's complete line of hydraulic cylinders. Generously illustrated by photos, diagrams and charts explaining the different mounting types and capacities of cylinders up to 1500 psi and 3000 psi working pressure. Lindberg Engineering Co.

ELECTRICAL

107 Motors and Drives—Illustrated Bulletin A-2703 is a quick-reference guide giving capsule data on company's a-c motors from ¼ to 300 hp; heavy duty d-c motors from ¼ to 1000 hp; all-electric adjustable speed drive for a-c circuits, from ¼ to 300 hp; electronic controls and regulators for this motor-drive system; and motor-generator sets, generators, and regulators. Reliance Electric & Engineering Co.

108 Electrical Equipment for Chemical Processing—Divided into three sections—power generation, distribution and utilization—Form B-5656 illustrates and explains the function of electric equipment as varied as turbine-generators and bus duct. Apparatus is covered concisely, giving only standout characteristics and advantages of each to the chemical processing industry. Westinghouse Electric Corp.

109 Trolley Power Distribution System—Illustrated Bulletin 27 briefly describes new heavy-duty trolley busway electric power distribution systems of 250, 375 and 500 amp, 250 v d-c, 575 v a-c, single and three-phase. Construction details are pictured, advantages discussed. Feedrail Corp.

110 Magnetic Amplifiers—The first line of Magamp magnetic amplifiers produced by this company is described in 18-pp Booklet TD-52-600. Defines magnetic amplifier terminology and explains the theory of operation. Curves, tables and wiring diagrams are used profusely throughout the sections dealing with component parts, applications and operating characteristics. Westinghouse Electric Corp.

111 Mercury Switches—Issue No. 1 of the Mercury Pool, 2 pp, contains information about company's mercury switches, their features, uses and new designs. Illustrates some typical samples of the 900 types available. Micro, Div., Minneapolis-Honeywell Regulator Co.

112 For Deep Well Pumping—Users of deep well turbine pumps will find interesting developments in vertical motor design in 16-pp Form F1454 featuring company's Verticlosed motors. Numerous design improvements are presented. Full color illustrations show the motor and individual features. Engineering data include discussions of tandem bearings, dual balancing of rotors. U. S. Electrical Motors Inc.

MATERIALS HANDLING

114 Fork Truck Comparison Chart—Designed to permit quick comparisons of various truck makes, this handy comparison chart lists 27 buying guides. There is space for comparative analysis of the several points, and the chart is a convenient size for filing. Lewis-Shepard Products, Inc.

115 How to Pick a Truck—Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrate important construction and design features. The Baker-Raulang Co.

116 Lift Truck Operator's Guide—"How to Operate a Lift Truck" is a 24-pp handbook serving as both beginner's text and experienced operator's refresher course. Tells how a lift truck is designed, what

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it's intended to do and how it should be used. Combining a cartoon technique with a detailed manual approach, the booklet is packed with information not only on truck operation, but also preventive maintenance, safety and basic materials handling. Hyster Co.

117 Tire Guidebook—This 12-pp booklet shows manufacturer's complete industrial tire line, telling the service in which each tire should be used. Contains many useful maintenance tips on the care of industrial tires and points out advantages of company's tire and wheel analysis plan. B. F. Goodrich Co.

118 Cost-Cutting Conveyor Units—Standardized gravity and power units covering a wide range of conveying jobs are described and pictured in Bulletin 63-C, 30 pp. Roller, wheel, and belt conveyors, elevating units, drives and accessories are presented, along with specifications and application information. Practical in its approach, this book offers ideas for the use of these modern conveying units in meeting individual plant handling needs. Standard Conveyor Co.

119 Steel Belt Conveyor — Catalog 230 contains 9 pp of drawings, engineering data and photos of a new steel belt conveyor. Discusses advantages of the improved belt, also presents other engineered conveyor applications. Prab Conveyors, Inc.

120 Conveyors for All Jobs—Catalog 400, 24 pp, presents application information and design details on a complete line of conveyors. Covers roller, wheel and belt types, elevating equipment, cable and chain trolleys, drag line conveyors, bulk handling equipment and special purpose conveying equipment. The E. W. Buschman Co., Inc.

122 Roller Top Chain—A new chain for lumber sorting tables and similar applications is introduced in Folder 2429. Having three rollers instead of one, this chain is designed to speed up sorting of lumber by preventing one board from dragging another with it when pulled from the table. Photos and sketches show how the chain is constructed. Link-Belt Co.

123 Feeders and Rotary Valves—Eight-pp Bulletin F-4 gives engineering data on roll, vane-type, and enclosed type feeders, and rotary valves for dry pulverized and granular materials. Illustrated with photos, sketches and dimensional drawings, text construction and use. Includes list of materials handled by feeders. Fuller Co.

124 Bag Holders — Six-pp Bulletin 0452 covers four different types of holders for securing bags to hopper outlets during filling. Includes photos and gives operating details and recommended applications for clamp, inflated-ring, cable and cam grip types of holders. Covers high-speed filling operations, handling of toxic materials, etc. Richardson Scale Co.

MAINTENANCE AND CONSTRUCTION

125 Maintenance Manual — "Over the Rough Spots" is a 48-pp pocket size booklet giving the answer to practically every repair or building maintenance problem. Tells how to patch holes and resurface floors, how to prevent water seepage in underground foundations, repair leaky roofs, preserve concrete or wood surfaces, protect structural steel from rusting, and gives many time and labor saving methods. Generously illustrated with how-to-do-it photos and sketches. Stonhard Co.

126 Scale and Rust Removal—Practical suggestions on removing hard water scale and rust deposits are provided in Form 4305, a pocket-size 28-pp booklet, featuring company's Compound 32. Discusses this formulation, gives general instructions for use, safety measures to be observed. Gives procedure for use on a wide range of equipment—condensers, compressors, diesel engine cooling systems, refrigeration equipment, meters, etc. Oakite Products, Inc.

127 Scaffolding Equipment—Illustrating in detail a complete line of steel scaffolding equipment, Form KP is divided into sections covering maintenance scaffolding, sectional steel scaffolding, and allied equipment. Applications and specifications of each are covered together with "package" units. Wilson-Albrecht Co.

128 For Above-Ground Maintenance — A practical equipment selection guide rather than an ordering book, 6-pp Bulletin G-205 is titled, "Controlling Costs when Maintenance Goes Above Arm's Reach." Details basic factors and conditions to be considered in determining most efficient equipment to place men at working height readily and safely for easiest working conditions. Physical and operating conditions are taken into account, also nature of work. The Patent Scaffold Co.

129 How to Lay Concrete Slabs—This revised erection procedure folder on company's floor and roof system is filled with on-the-job photos showing every step in the laying of the precast concrete slabs from delivery to finish caulking. The Flexicore Co., Inc.

130 Flooring Guide—Plant engineers interested in specifying an appropriate type of resilient tile flooring will find valuable information in Form 107, a 4-pp reference guide. Tells what each type of resilient tile is recommended and not recommended for. Specific information is given for asphalt tile, cork tile, rubber and greaseproof tiles. Covers right and wrong uses of the products, explains how these floorings are made and the type of surface over which each may be installed. Also covers relative costs. Kentile, Inc.

132 What to Do about Sashes—Problems and suggested methods for economical maintenance of steel and wood sash are outlined in this bulletin titled, "Trouble-Free Sash Maintenance." Subjects covered include importance of making buildings tight and draft-free, comparison of putty and mastic glazing for windows, value of caulking openings between sash and masonry, methods of painting rusted sash without removing rust, and weathering of warped ventilators. Illustrations show full color range of a glazing compound which needs no painting. The Tremco Mfg. Co.

133 Galvanized Steel Windows — This informative 12-pp brochure shows how hot-dip galvanizing of steel windows contributes to maintenance-free durability. Step-by-step procedures in manufacturer's new hot-dip galvanizing plant are fully illustrated and explained. Technical explanations and specifications included. Detroit Steel Products Co.

134 How Hardboards Improve Methods—Twelve-pp Form 5202, on production economies in plant maintenance, materials handling and processing, enumerates applications and specifies types and thicknesses of company's Presdwood for specific purposes. Lists 28 advantages of Presdwood, describes its use in architectural applications, bins, utility boards, cabinetwork, containers, booths and ventilators, work surfaces and many other applications. Includes directions for working and tooling of Presdwood. Masonite Corp.

(Continued on page 189)

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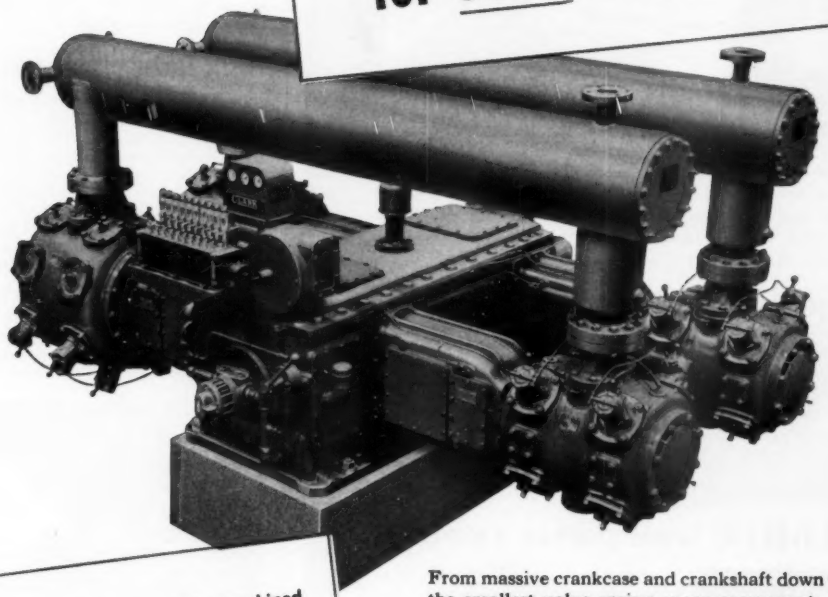

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- Extra rugged, heavy duty compressor cylinder valves precision built for long, hard service.

From massive crankcase and crankshaft down to the smallest valve spring, *every* component of Clark Balanced/Opposed Air Compressors is machined and finished to infinitely accurate tolerances.

Such unequaled, precision construction — *plus vibrationless operation through perfect balance* — are your assurance of extremely long life with a minimum of maintenance. Clark Balanced/Opposed, Motor-Driven Air Compressors are designed and built to serve *indefinitely!*

For information on this truly modern line of air compressors, covering a range of 150-4500 bhp, request Bulletin 118.

CLARK balanced/opposed compressors

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HOW MUCH LOST PRODUCTION DO SLIPPING ACCIDENTS COST YOU?

ACCIDENT REPORT

Cause of accident: Man slipped on oily machine-tool base.

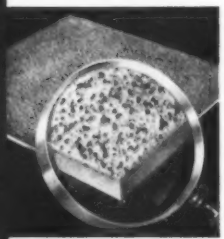
Means of prevention: Install A.W. ALGRIP Abrasive Rolled Steel Floor Plate.

Count the cost of slipping accidents—in lost man-hours, production lag, and insurance premiums. We think you'll see, at once, how much less it costs to put positive non-slip protection in your plant with exclusive A. W. ALGRIP Abrasive Rolled Steel Floor Plate.

NON-SLIP—EVEN ON STEEP INCLINES!

We make ALGRIP by rolling rough, tough abrasive grain (the kind you'll find in grinding wheels) uniformly as an integral part of the steel plate's upper portion. Hundreds of these tiny abrasive safety brakes grip your feet at every step—prevent slipping, even on wet or oily surfaces, even on steep inclines!

ALGRIP WON'T WEAR SMOOTH!



ALGRIP's safety is more than surface deep. The abrasive grain is distributed evenly and deeply, so that as the surface wears, new particles are exposed. Result: ALGRIP keeps its anti-skid qualities for a lifetime—without maintenance. And because rolled steel makes it stronger than other abrasive floorings, ALGRIP withstands hard blows and heavy loads—can be used in thinner sections without reducing load carrying capacity.

LEARN HOW LITTLE SAFETY COSTS TODAY

Our new Booklet A-5 gives full technical details, suggests uses for ALGRIP. We'll be glad to send you a copy and answer any questions you may want to ask — without obligation. Write us today.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

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Over 125 years of iron and steel making experience

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

clearances to compensate for expansion, is very satisfactory. Above 300 F, consideration must be given to the selection of special materials for the pump construction. *From an article by W. E. Bakewell, in Viking Vacuum, published by Viking Pump Co., Cedar Falls, Iowa.*

Plastic Tooling with a Future

IN ONE FORM or another, plastics have been used in airplanes since the first one took to the air. But the sturdier plastics, those with high tensile and sheer strengths, are comparatively new to aircraft production. Application of plastics using Fiberglas to tool-making is probably the newest and fastest-growing use to which these stronger plastics have been put.

In twelve months, the plastic tooling shop at Boeing, Seattle has grown from a one-man operation using 5 gallons of resin each month to an 18-man shop using 800 gallons.

Tooling engineer observes the use of experimental fixture. This device weighs about 110 lb less than older fixture

And, bursting at the seams, it promises to continue growing as the dollars-and-cents value of plastics in tooling asserts itself even more.

The tough but highly adaptable materials are cutting aircraft production costs, all right. But they're still limited in their tooling uses; current economies, tooling men will tell you are nothing compared to what is ultimately expected.

One of the plastic tools proving better and more economical than its metal forebear is the plastic metal-bonding jig. Metal-bonding jigs are large tools which make possible the fixing of stress members to aircraft skins with an adhesive. Before they came along, rivets and spotwelds did the job, with unavoid-

"Tycol Armitage boosts bearing life... smooths the way for faster, heavier loads"

Of course! Tycol Armitage Bearing Grease "stays put" ... keeps anti-friction bearings running smooth and cool. Its high stability makes it suitable for sealed anti-friction bearings that must last the life of the equipment.

Tycol Armitage possesses exceptional resistance to oxidation.

The dependable lubricating ability of this quality grease lengthens bearing life and cuts down maintenance costs.

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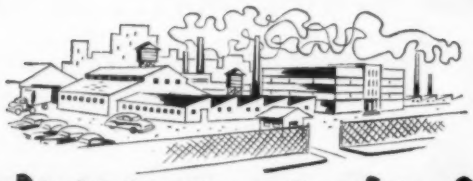

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✓ **THIRD** . . . losses caused by defending damage suits brought by your neighbors. Whether justified or not, these claims cost money to defend, and impair your public relations.

INDUSTRIAL SOUND CONTROL, Inc., can solve your problems by stopping noise at its source, through the use of sound traps, portable sound barriers, soundproofed rooms, and machinery enclosures, used singly or in combination. Let ISC, famous for "quieting anything that makes noise", protect you from these losses at surprisingly low cost.

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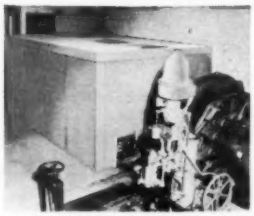

"Soundproofing a noisy pump or compressor with ISC 'Soundmetal' panels."

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For more facts circle 533 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

able distortion of aerodynamic surfaces.

The plastic jig, developed in the past year, is an improvement on the old one made of metal and wood. Instead of requiring machining, this tool is shaped over an accurate wood-and-plaster form using polyester resin and Fiberglas cloth. It is "cured" in a vacuum bag which holds the plastic to the form, insuring a perfect tool.

The entire plastic-jig manufacturing operation, including making the form—which can be used to make other identical metal-bonding jigs—costs less than reworking a damaged old-style jig. Added advantages are light weight, simplicity in design and manufacture, and small size. The last characteristic is a benefit in storage.

"We figure the saving per jig to be about $3,000," says Granville Black, one of Boeing's tooling engineers. "That's a conservative estimate that counts the cost of making the original form." *From Boeing Magazine, published by Boeing Airplane Co., Seattle, Washington.*

Steam Puts On Rubber Coat

THE MANUFACTURE of rubber hose presented a difficult problem to the engineers at the Thermoid Rubber Co. of Trenton, N. J.

The problem was this. During a key phase of the production operation the hose tube, which is covered with a reinforcement, is coated with rubber in a plastic state. This process takes place in a unit where a powerful suction must be employed to draw the rubber down, around, and against the reinforcement.

The suction has to be consistently strong enough to insure that the rubber will be applied tightly and uniformly around the core. This is to guard against looseness which might result in processing difficulties and unsightly surface defects.

In addition, the suction must be strong enough to pull off any foreign substances or particles from the braided material. Otherwise, these could prevent uniform adhesion be-

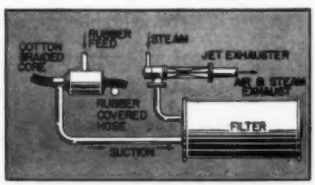
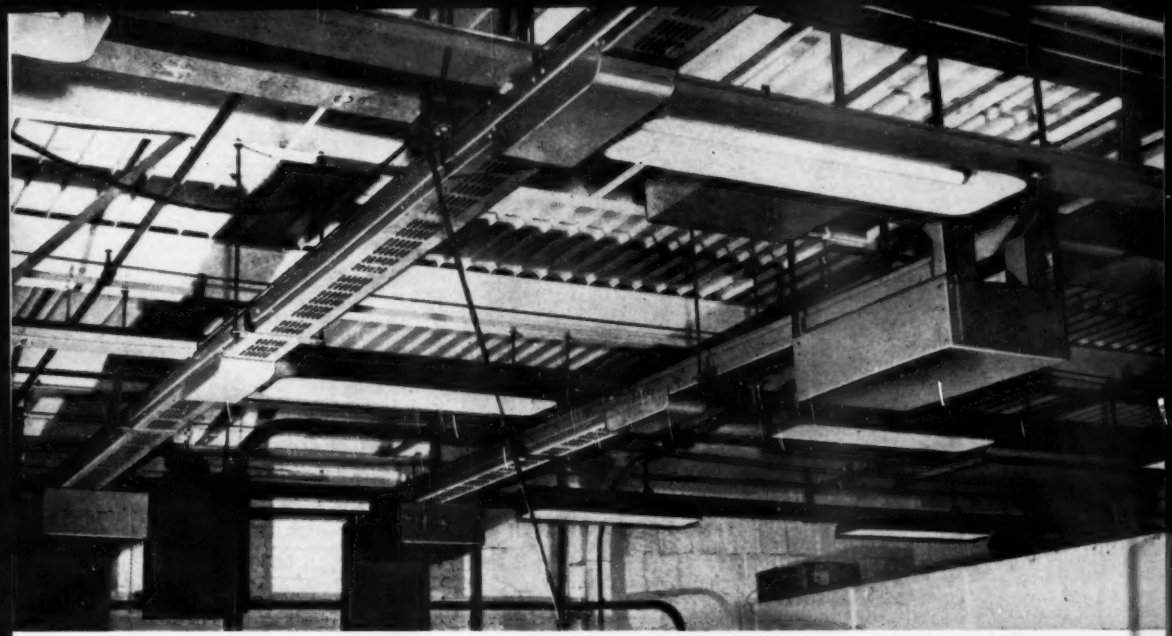


Diagram shows rubber coating system that was devised by Thermoid engineers



TYPICAL TRUMBULL LVD FLEX-A-POWER installation in a large factory.

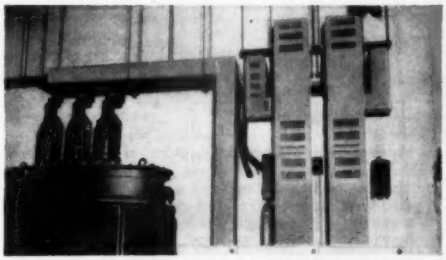
Modern power distribution made more convenient, more economical!

Industry has long taken advantage of the benefits of Trumbull LVD FLEX-A-POWER. FLEX-A-POWER's economy of installation, efficient performance and complete flexibility have aided in cutting plant overhead costs throughout the nation.

Now, Trumbull Electric offers LVD (Low Voltage Drop) FLEX-A-POWER with *aluminum* busbars—a major contribution to the busway field.

LVD now has the outstanding additional advantage of being 25 to 35% lighter in weight—making LVD FLEX-A-POWER easier to handle and cheaper to install. All joints are silver plated for positive contact and longer life. In many cases there is less voltage drop, which contributes to operating efficiency.

There is no delivery problem with aluminum LVD. Write for complete information.



ONE OF MANY APPLICATIONS OF ALUMINUM LVD FLEX-A-POWER is as a feeder from transformer to switchboard.

The modern Trumbull LVD FLEX-A-POWER is available with current ratings of from 600 to 3000 amps, in 2, 3 or 4 pole construction, 4000 amps in 2 and 3 pole construction, and is suitable for 600 volt service.

Trumbull Assures LASTING FLEXIBILITY in Power Distribution

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DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONN.

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Solves these Problems

with this modern equipment

BLAST CLEANING!

Blast Cleaning Cabinet quickly and easily cleans rust, grime, dirt, paint, etc., from metal parts. Produces a clean, smooth surface on pieces up to 60" x 36". Models available from $319.00 and up.

Blast Cleaning Machine not only removes rust, dirt, scale, etc., but is ideal for maintenance and many other uses. Cleans large objects such as bridges, structural work, tanks before painting. Six sizes, portable or stationary, from $170.00 and up.

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Unit Dust Collector stops dust at its source, minimizes machine wear and tear, reduces housekeeping and general maintenance costs. Solves many grinding and polishing nuisances. Reduces material losses. Models from $286.00 and up.

PRECISION FINISHING!

Hydro-Finish Cabinet uses liquid blast, eliminating dust, and reduces costly hand polishing, cleaning and finishing of molds, dies, tools, etc. Removes scale, discoloration and directional grinding lines, prepares surfaces for plating and coating. Holds tolerances to .0001". Models from $1410.00 and up.

LOOK TO PANGBORN FOR THE LATEST DEVELOPMENTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

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- ☐ Blast Cleaning Machines
- ☐ Unit Dust Collectors
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City.....Zone.....State.....

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

tween the braid and the rubber.

Thermoid engineers solved the problem with a jet exhauster. To the part of the unit where the rubber is drawn in, around, and against the core, they attached a rubber hose. This hose was connected to filters and was then connected to the suction connection of the exhauster.

Steam, entering the exhauster through the pressure inlet, issues through an expanding nozzle in the exhauster at high velocity. It entrains air from the inside of the hose making unit, and discharges to the atmosphere. Operating at a vacuum reading of 24 to 26 in. Hg, the exhauster maintains a consistently strong suction — sufficient to cause the rubber to be drawn into the coating unit and tightly and uniformly applied around the core.

The engineers report that the highly satisfactory performance of the jet exhauster has practically eliminated production problems during this phase of the operation. Further, the exhauster has displayed great superiority over the mechanical vacuum apparatus formerly used in this operation. Whereas the previous equipment required constant maintenance in order to insure proper operation, this jet exhauster requires practically no maintenance. *From Engineering News, published by Schutte and Koerting Co., Cornwall Heights, Bucks County, Pa.*

Clear Coating Halts Water Entry Through Walls

SOMEONE figured out one time that an ordinary clay brick could absorb as much as 12 oz of water. Concrete, stucco, block, stone and other types of masonry are also porous and absorb water. From this, it is evident that an exterior masonry wall is capable of absorbing moisture almost like a sponge.

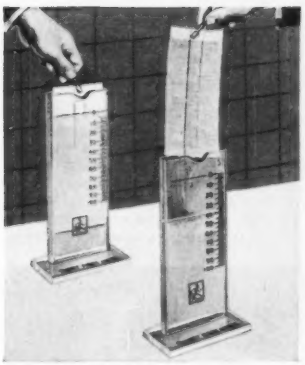
The water the masonry does not absorb may go right through a wall and wet the interior causing rot and rusting. A generally damp and unsanitary interior condition is developed.

As a case in point: A large new building had "wall leakage" trouble last year. Driving rains were penetrating the brick and wetting interior surfaces. The construction included 8 in. curtain walls made of pressed brick, backed up with a coarse narrow concrete block.

To remedy the condition of water penetration, a contract was let to a contractor with the stipulation that

Now, economize
by using the best!

ScotTissue Towels
save more
because they do more



SAVE TOWELS!

In this "Thirsty Fibre" meter test, where a ScotTissue Towel is immersed in water for just 20 seconds, you can see for yourself the quick absorption and great water-retention capacity of this towel. This is the reason fewer ScotTissue Towels are used per employee per year.

SAVE TIME!

Employees appreciate famous ScotTissue Towels . . . they're softer and stronger than ever . . . compare them against any other paper towel. Since one ScotTissue Towel dries both hands quickly, there are less washroom "traffic jams." Workers are able to get back on the job faster.

SAVE MAINTENANCE!

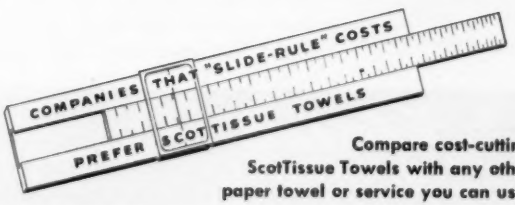
With fewer ScotTissue Towels used, less storage space and servicing of dispensers and receptacles is required—reducing janitor labor costs. That's why companies who "slide-rule" costs prefer ScotTissue Towels. So, switch to ScotTissue Towels—they *save* more because they *do* more!

Take advantage of our unique Washroom Advisory Service

Washrooms are one of the most important essentials in good working conditions. We'll be glad to give you tested plans and specific suggestions for improving your washrooms. And if you would like a personal demonstration of cost-cutting ScotTissue Towels—the "Thirsty Fibre" Test—just write: Washroom Advisory Service, Scott Paper Company, Chester, Pennsylvania.

"ScotTissue," "Washroom Advisory Service," "Thirsty Fibre," Reg. U. S. Pat. Off.

SCOTTISSUE TOWELS
Symbol of the right kind of washroom



Compare cost-cutting ScotTissue Towels with any other paper towel or service you can use!

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Koiled Kords*

FOR

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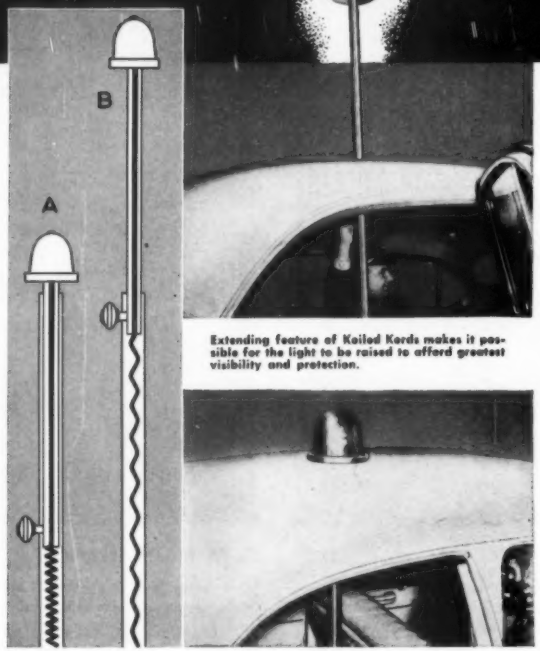
APPLICATIONS



Extending feature of Koiled Kords makes it possible for the light to be raised to afford greatest visibility and protection.

Line drawings show position of Koiled Kord (A) retracted and (B) extended within light standard.

Normal position of light is snugly fitted to top of car. In this position, the Koiled Kord is retracted within the standard.

The telescopic emergency lights made by McDonald and Arneson, Vallejo, California, demonstrate an interesting application of the expanding and retracting abilities of Koiled Kords.

In this case, by the use of a combination of straight and Koiled Kord, one tube can telescope within the other without interference from the cord which is contained in the outer tube.

Write for illustrated bulletin showing many uses for Koiled Kords.

*TRADE MARK

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

a clear material be used. Another requirement was that it would not darken or alter the appearance of the brick.

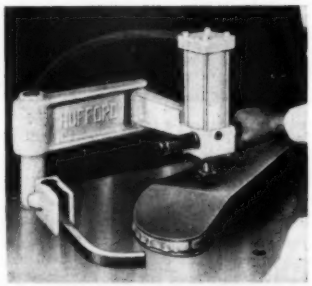
The contractor relied on experience in choosing sealing material which contained silicone. A portion of the building had been covered when a driving rain storm started. This was similar to the one that had beaten through the walls before.

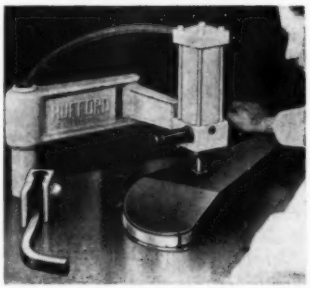
After the storm, it was noted that no penetration of moisture occurred where the building was treated with sealing material. An untreated area permitted the passage of moisture to the interior. This same experience has been duplicated in other localities at different times. *From Building Maintenance, published by Truscon Laboratories, Detroit, Michigan.*

Lead Slapper Takes the Kinks Out

IN FORMING sheet metal parts, a serious problem that consumes time and labor is the removal of wrinkles from the edges of pressed metal parts. Wrinkles commonly occur when a sheet metal edge is turned and the metal placed in compression.

The fatiguing manual operation





The top view shows a piece of wrinkled sheet metal in position over a forming die. Below is same metal after slapper applied a series of blows to it. Note how lead in the arm of the machine conforms to the curvature of the work

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This useful book, replete with pictures, graphs and charts, contains specific information on Kaylo Heat Insulation, including characteristics . . . efficiencies . . . recommended thicknesses . . . and application data for pipes, vessels and flat surfaces. For your free copy of this book, write: Dept. N-307, Owens-Illinois Glass Company, Kaylo Division, Toledo 1, Ohio.

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

for the removal of these wrinkles has been displaced by a shrink finishing machine. This piece of equipment employs a mechanically driven lead slapper to do the work. A foot pedal controls a pneumatic clamp to hold down the part to be finished. Further depression of the pedal actuates an arm fitted with a strip of soft lead causing it to strike a series of blows along the wrinkled edge.

The forming die remains in the work piece during the slapping operation, serving as an inner anvil. After the first few blows, the slapper conforms over its entire length to the shape of the work. By restricting the sheet metal flow to the area covered by the slapper and compressing the metal to occupy less surface area, the wrinkles disappear.

The strip of lead used in the machine is cast, soft lead approximately ¾ by 1 by 15 in., weighing almost 5 lb. The service life of a hammer depends, of course, upon the use, but normally 20 hammers or slappers are so consumed per day. After a slapper has served its useful life, it is simply melted down and recast. *From Lead, published by Lead Industries Association, New York, N.Y.*

Motor Trucks Powered with LP Gas

SPECIAL FUEL carrying and control features designed to insure safe and efficient operation mark the new series of trucks powered by liquified petroleum gas burning engines. This is reported by W. K. Perkins, manager of motor truck sales for International Harvester Co.

He went on to say that after many months of close cooperation between the engineering department and the Underwriters Laboratories all of the components used in the company's LPG installation are listed as standard by the Underwriters Laboratories.

The fuel (propane-butane) is carried in two 62 gal water-capacity tanks. These may be filled to approximately 80 per cent of water-capacity, depending on outside temperature. The weight of these special tanks when fully loaded is about the same as that of gasoline safety tanks of comparable capacity.

The tanks are produced in strict accordance with the ASME code for unfired vessels. They are designed for a working pressure of 250 psi with a safety factor of 4 to 1. Two stacks at the rear of the cab serve as exhausts in the event the relief valves should open.

All fuel lines are extra heavy duty, providing added protection against corrosion and fatigue due to

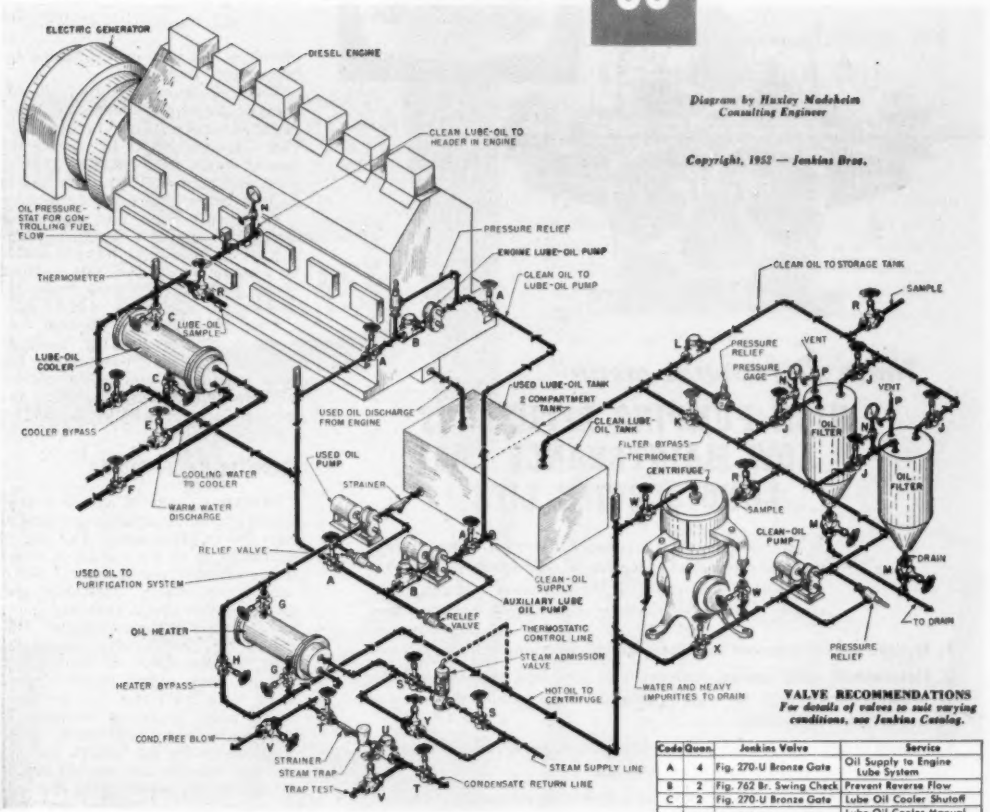

Diagram by Huxley Madeheim Consulting Engineer

Copyright, 1952 — Jenkins Bros.

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog.

Code	Quan.	Jenkins Valve	Service
A	4	Fig. 270-U Bronze Gate	Oil Supply to Engine Lube System
B	2	Fig. 762 Br. Swing Check	Prevent Reverse Flow
C	2	Fig. 270-U Bronze Gate	Lube Oil Cooler Shutoff
D	1	Fig. 270-U Bronze Gate	Lube Oil Cooler Manual Bypass
E	1	Fig. 930 Bronze Globe	Cool Water Supply to Lube Oil Cooler
F	1	Fig. 270-U Bronze Gate	Water Discharge Shutoff
G	2	Fig. 270-U Bronze Gate	Oil Heater Shutoff
H	1	Fig. 270-U Bronze Gate	Oil Heater Manual Bypass
J	4	Fig. 270-U Bronze Gate	Oil Filter Shutoffs
K	1	Fig. 270-U Bronze Gate	Oil Filter Manual Bypass
L	1	Fig. 762 Br. Swing Check	Prevent Reverse Flow
M	2	Fig. 930 Bronze Globe	Filter Drains
N	3	Fig. 743-G Br. Needle	Pressure Gage Control
P	2	Fig. 930 Bronze Globe	Filter Air Vents
R	3	Fig. 930 Bronze Globe	Oil Sampling Take Offs
S	2	Fig. 270-U Bronze Gate	Steam Supply to Oil Heater
T	2	Fig. 270-U Bronze Gate	Condensate Shutoffs
U	1	Fig. 762 Br. Swing Check	Prevent Condensate Backflow
V	2	Fig. 930 Bronze Globe	Condensate Bypasses Free Blow Trap Test
W	2	Fig. 270-U Bronze Gate	Centrifugal Shutoff
X	1	Fig. 270-U Bronze Gate	Centrifugal Bypass
Y	1	Fig. 956 Bronze Globe	Bypass on Automatic Steam Valve

How to plan a LUBRICATION OIL PURIFYING SYSTEM FOR DIESEL ENGINES

Lubrication oil purification systems are used on practically all modern diesel engines to assure longer oil life and decreased engine maintenance. Purification, however, must be accomplished without removing beneficial oil additives which increase lubricant efficiency and preserve bearing surfaces.

The diagram above shows a typical lubrication oil purification system designed to meet diesel engine needs. Circulated oil from the engine is returned to a tank and part or all of it is pumped through a heater. Here, it is raised to optimum cleaning temperatures. A centrifuge then removes water and impurities. The partially cleaned oil next passes through filters, where light impurities and colloidal carbon are removed.

In normal operation of the diesel, the lube-oil enters a clean oil storage tank, after which it is pumped back to the engine through a cooler, generally a shell and tube heat exchanger with water as the coolant, which reduces oil temperature raised during purification.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installations.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 63.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864
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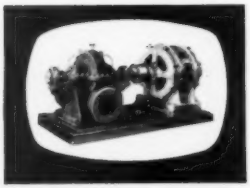
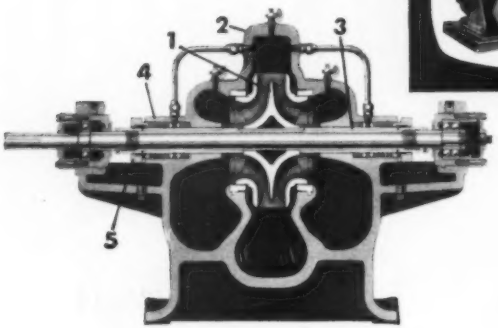
GOULDS Fig. 3450—Single-stage centrifugal pump: Capacities up to 15,000 G.P.M. Heads up to 500 ft.





These **5** *features mean*

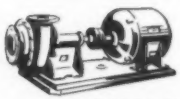
HIGH PUMPING EFFICIENCY
LOW MAINTENANCE COST
LONG SERVICE LIFE

Whenever you need a pump for *general water supply, in-plant circulation of liquids, booster service or low pressure boiler feeding,* check the economy features these sturdy Goulds single-stage centrifugal pumps offer.

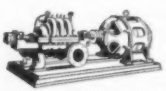
1. **Hydraulically balanced impellers** assure freedom from vibration.
2. **Horizontally split casing,** matched and dowelled, makes access to working parts easy. All water passages exceptionally smooth due to careful core making.
3. **Heavy bronze shaft sleeve** ground to smooth finish reduces friction. Saves power. Reduces wear on packing.
4. **Deep stuffing box** and bronze water seal ring minimize chance of leakage.
5. **Gland horizontally split and bolted** to make repacking easy.

These pumps are available in all-iron or all-bronze construction, as well as standard bronze fitted. Maximum interchangeability of parts keeps inventories at a minimum. For complete details and specifications call your Goulds representative or send for Bulletin 721.2.

Other GOULDS PUMPS for power and plant services



GOULDS Fig. 3169
Single stage centrifugals for general processing purposes. Capacities to 1100 G.P.M. Heads to 180 ft.



GOULDS Fig. 3330
Multi-stage centrifugal pumps for boiler feed and pressure service. Capacities 40 to 2000 G.P.M. Heads to 850 ft. Bulletin 722.L

GOULDS Fig. 3650
"Close-coupld" single-stage centrifugal for general industrial use. Capacities to 2000 G.P.M. Heads to 400 ft. Bulletin 710.1.

MEMBER

Goulds PUMPS INC.
Seneca Falls
New York

For more facts circle 541 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

vibration. All nuts on the tubing are heavy duty forged.

The regulator, mounted at the front of the engine, is a combination vaporizer and pressure-reducing device. Its function is to receive the flow of liquid fuel under tank pressure, and convert it into dry gas at slightly below atmospheric pressure.

The flow of this dry gas to the carburetor is also a function of the regulator. The only adjustment to the regulator is the idle setting. Water jacketing controls temperature conditions.

From the regulator, the fuel proceeds to the specially designed carburetor. A gas economizer has been provided to assure the correct mixture of fuel and air. *From a release of International Harvester Co., Chicago, Ill.*

Detective Radioisotopes

BENEFICIAL USES of atomic energy promise to be even more spectacular than the military ones. The use of radioisotopes in the testing of evaporator effectiveness is one of these.

It is extremely desirable that steam used to drive turbines be as free from impurities as possible. Unfortunately, some of the mineral sales, chiefly those of silicon and sodium, have a bad habit of joy-riding with the steam.

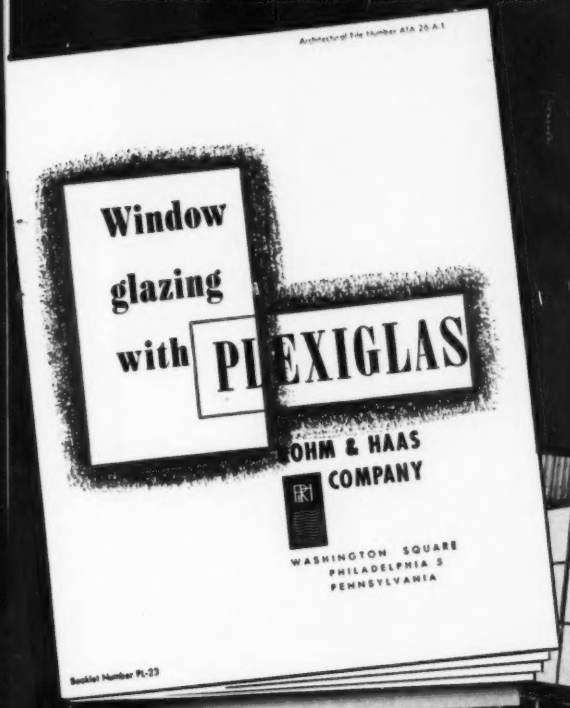
The usual chemical analyses of condensate from evaporators, which distill water for the boilers, can accurately indicate the amount of impurities in the water. This amounts to a teaspoon of matter scattered throughout the 5,000 gal of water in one evaporator.

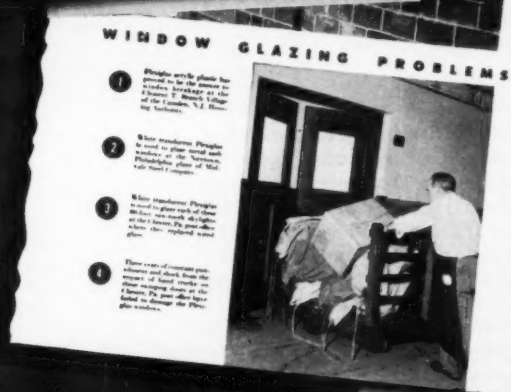
But Union Electric engineers wanted even greater accuracy. They wanted to be able to detect the presence of impurities as widely strewn throughout the boiler feedwater as one part per 100 million.

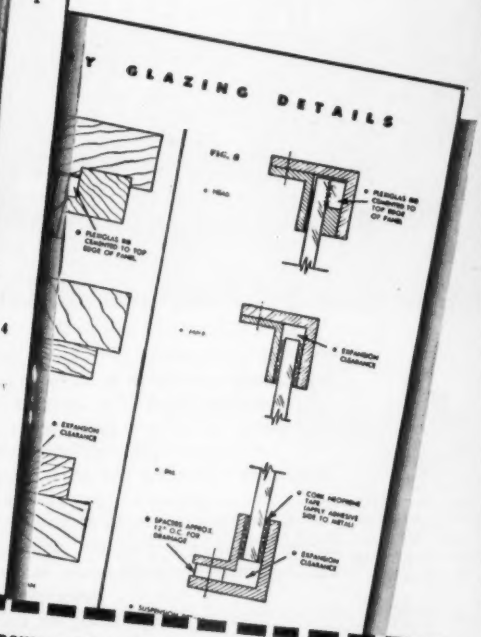
To do this, an almost infinitesimal speck of Sodium 24 was dunked in an evaporator full of water. The activity of the water was then established by a scintillation counter, a development of the Geiger counter. This examination counted the number of radioactive atoms evenly distributed throughout the tank before distillation began.

Since they knew what they had in the water when they started out, the technicians, by counting how many souped-up atoms were escaping into the stream, could determine the performance of the evaporator by simple subtraction. *From Union Electric Quarterly, published by Union Electric Co., St. Louis, Missouri.*

MAIL COUPON FOR NEW 16-PAGE BOOKLET






GLAZING DETAILS
FIG. 2
PLEXIGLAS MUST BE CEMENTED TO TOP EDGE OF FRAME
EXPANSION CLEARANCE
CORE MOHAWK TAPE (APPLY ADHESIVE SIDE TO METAL)
SPACERS APPROX. 12" O.C. FOR DRAINAGE

End Frequent Window Breakage and Cut Glazing Replacement Costs

This booklet shows how industrial plants, troubled with frequent window breakage, can cut maintenance costs by using PLEXIGLAS acrylic plastic for replacement glazing. Tough, resilient PLEXIGLAS—light in weight and highly resistant to breakage—can be installed quickly and easily in standard metal or wood sash. It is available as completely transparent material, or in translucent grades that transmit a high percentage of light, provide excellent diffusion, minimize sky glare, and curtail solar heat.

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ROHM & HAAS COMPANY, PLASTICS DEPARTMENT
Washington Square, Philadelphia 5, Pa.

I want to know more about cutting glazing replacement costs with PLEXIGLAS acrylic plastic. Please send me ____copies of your new booklet, "Window Glazing with PLEXIGLAS."

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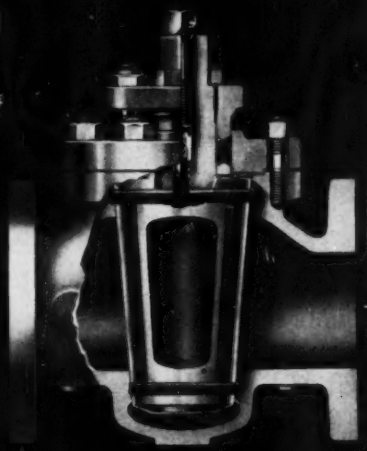


LUBRICATED PLUG

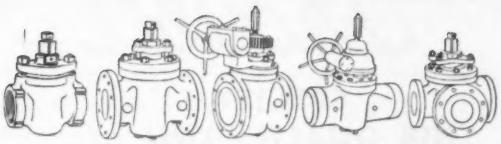
COMPLETE LINES OF LUBRICATED PLUG VALVES

Because of the wide range of services to which Lubricated Plug Valves can be adapted, they may be classed as "all-purpose" valves. Walworth manufactures complete lines of Lubricated Plug Valves in a variety of types and materials for working pressures up to 5,000 psi and for vacuum services. Sizes range from ½ to 30 inches. Write for descriptive literature.

Walworth also manufactures complete lines of gate, globe, angle, and check valves made of steel, bronze, iron, and special alloys.

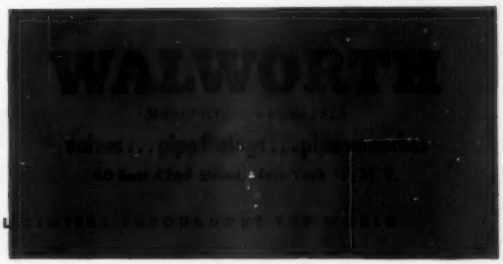
Walworth valves, pipe fittings, and pipe wrenches total approximately 50,000 items and are sold through distributors all over the world.

Walworth engineers will be glad to help you with your problems. Call your local Walworth distributor, nearest Walworth sales office, or write to our General Offices, 60 East 42nd Street, New York 17, New York.



Illustrated in section is a Walworth No. 1700F Regular Gland Type, Wrench Operated, Steeliron, Lubricated Plug Valve. This particular line of valves has a working pressure rating of 200 psi at 150F or 125 psi at 450F. Sizes range from ½ to 8 inches. Other Walworth Lubricated Plug Valves include Single Gland and Ball Bearing types. They are available for a variety of working pressures.

For best results use Walworth Lubricants and Walworth High Pressure Lubricant Guns.



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SOLENOID MOTOR CONTROL

QUALITY

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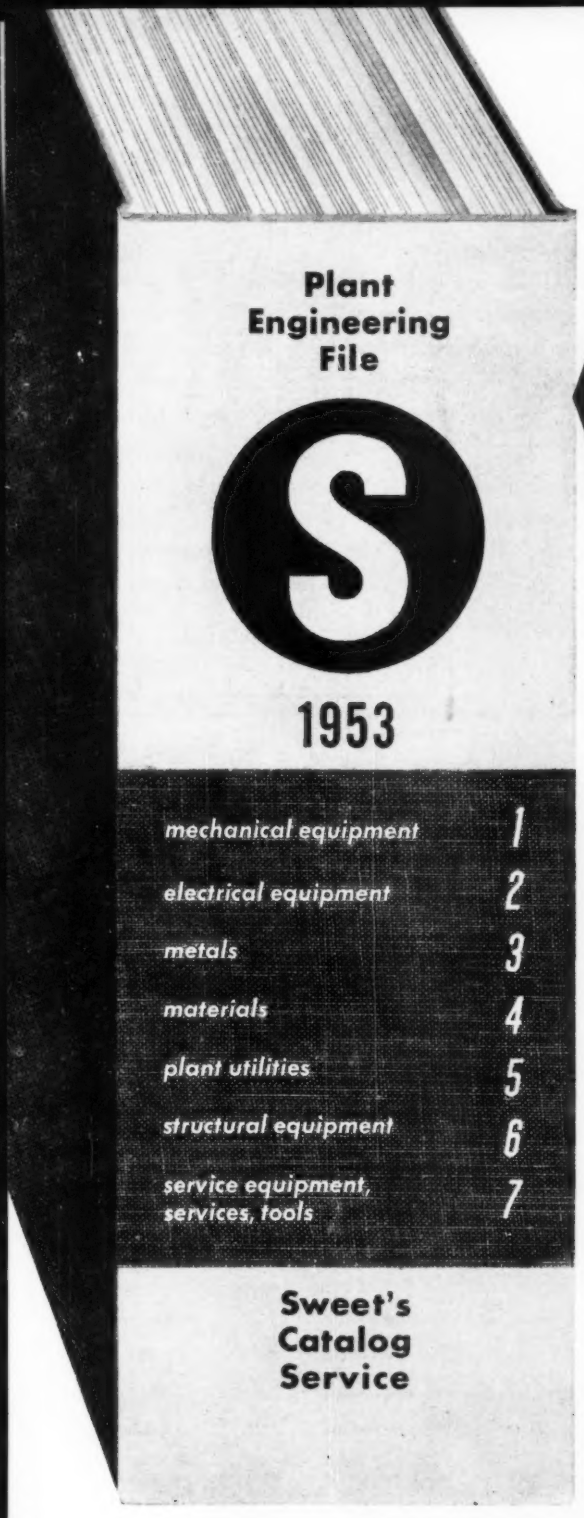

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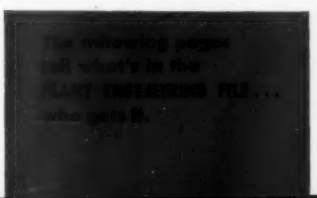

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because the activities and responsibilities of plant engineering men cover a wider range of plant operation than those of any other occupational group in industry. As a result, plant engineering men have a great need for readily accessible information on many products.

because many who sell to the Plant Engineering Market have encouraged the development of the PLANT ENGINEERING FILE as a means of making their catalogs and bulletins instantly accessible to plant engineering men.

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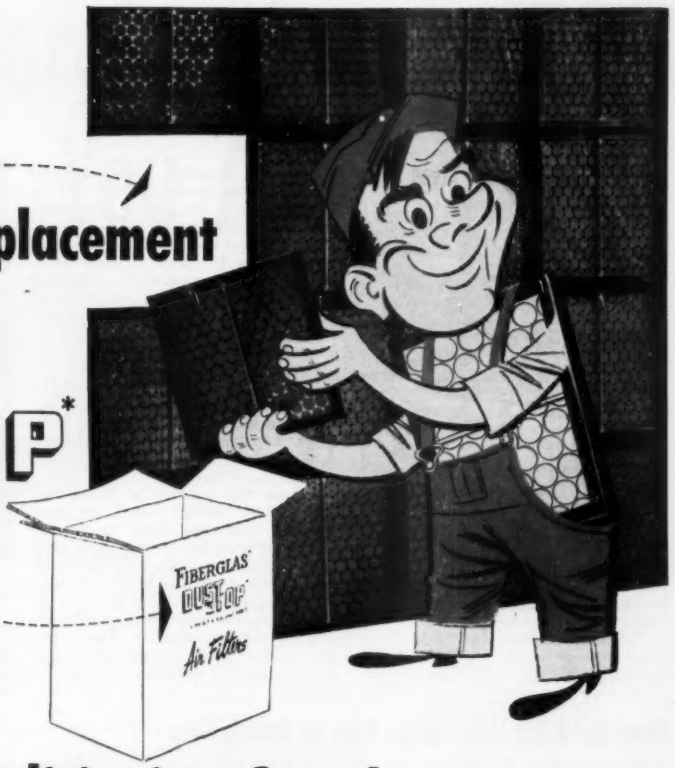

Cuts Air Conditioning Costs!

Regular servicing of your air conditioning equipment—by a competent outside service or your own men—is the first essential of air conditioning economy.

The second essential is the choice of filters for your unit. Fiberglas DUST-STOP* Air Filters, backed by years of research, have been designed to provide an optimum balance of efficiency and long life. This balance is achieved by two things: one, a special nondrying adhesive that retains its efficiency over a wide variety of operating temperatures and, two, a fiber diameter that is not so fine that it causes face loading—not so coarse that it allows poor filtering. DUST-STOP Filters trap virtually all dirt yet let air flow freely.

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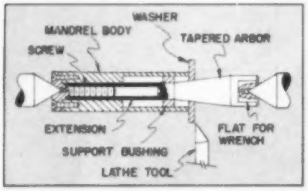
OPERATION & MAINTENANCE of industrial service and production facilities

Edited by H. E. B. Anderson

Mandrel Holds Washer Stock

Contributed by F. E. Riley

ON HIGH PRESSURE hydraulic equipment, particularly diesel engine fuel injection gear, heavy gauge copper washers are used as gaskets. Replacement washers used in repair work frequently have to be made in the maintenance shop, because the bores and diameters vary considerably.



Cross-section of mandrel with washer in position shows construction and use

The washers can be made from sheet copper stock, sheared to the approximate OD, then drilled to the bore size. Usually, these washers require an accurately turned OD, to fit in a recess. To achieve this accuracy, the washers are turned in a lathe, using a special mandrel which is adaptable to range of bore sizes.

The mandrel consists of a tapered arbor which will fit into the various bores of washer blanks. The small diameter end of the arbor has an extended cylindrical portion whose diameter slides into a bore in the mandrel body, and is supported by the body. This extension is also threaded internally to engage a long screw secured to the mandrel end. A sliding bushing offers further support to the arbor.

In use, the washer is placed on the tapered arbor, which is then screwed into the body until the washer is jammed on the taper, and the washer face contacts the end face of the mandrel body. At this point, the washer is held securely in two planes, and concentricity of bore and diameter is assured. The mandrel is then placed in the lathe, and the washer OD is turned to size.

Sheet Metal Clip Holds Scriber Point for Marking Lines

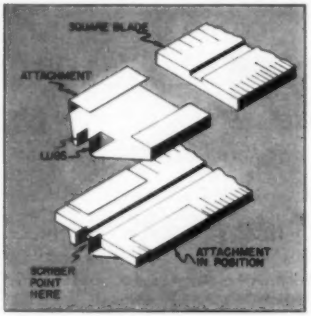
Contributed by R. E. Franklin

CONSIDERABLE PRESSURE must be applied to a scriber to produce a usable mark on sheet metal. While applying downward pressure on a scriber, it is difficult to keep the scriber point pressed against the end of the square. Often, the scriber point sticks, or strays away from the square as it is moved along the edge of the metal.

An attachment which slips over the end of an adjustable square enables mechanics and metal workers to scribe lines accurately. The device helps the worker to run the stock of a square down the edge of a long piece of metal, maintaining contact between the scriber point and the end of the square.

The attachment holds the scriber point so that both it and the square move along together. It consists of a piece of sheet metal cut to shape and folded. The sheet is bent to slide over the blade easily, and lugs are formed on the extended portions to receive the scriber point.

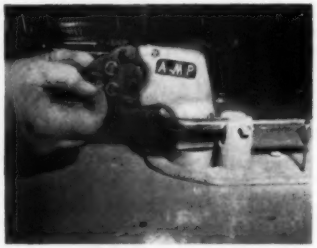
In use, the device is slipped over the end of the square blade and the scriber inserted between the lugs. As the square is slid along the edge of the metal to be marked, the lugs push the scriber along, permitting the operator to concentrate on holding the scriber correctly and sliding the square smoothly down the edge.



Sketch shows construction of attachment; photo illustrates the position of the tools in use scribing sheet metal

Table-Mounted Hand Tool

INCREASED SERVICE VERSATILITY is gained from a pneumatic hand lugging tool at Temco Aircraft Corp., Greenville, Texas, by table mounting the tool and triggering it with a foot pedal. Both the operator's hands are left free to handle wires, lugs and bonding braids.



Wire at right leads through table top to the foot pedal which triggers tool

At Temco's aircraft modification and overhaul center, the lugging tool is used in the electrical subassembly shop more often than on the job as a hand tool. Fitting the tool to the need, the hand tool was mounted on a bracket secured to the table with a single clamp under the table. Triggering is accomplished by means of a chrome steel bar connected to the foot pedal by a wire.

To remove the mounted tool for use in its portable version, the one clamp is loosened, the air line is disconnected, and the tool lifted out and put to use where needed.

Cleaning Congealed Oil From Refrigeration Evaporators

Contributed by H. N. Josleyn

MANY ANHYDROUS AMMONIA refrigeration systems are not getting maximum capacity or efficiency because of oil film and oil pockets in their evaporators. Oil is carried over from the ammonia compressor bases in varying amounts, dependent upon the condition of the compressors. A small amount of oil in the evaporators can cause a high percentage efficiency loss; a large amount of oil can cause a rapid falling off of the refrigerating effect.

This carry-over oil, usually found collected in any low spots, is best removed by installing a suitable drain at the lowest point in that portion of the system where the operation is at a temperature above 32 F. In lower temperature areas of the

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Springfield—Springfield Elec. Serv.

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Omaha—Omaha Electrical Works

NEW HAMPSHIRE
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NEW JERSEY
Atlantic City—Charles A. Buckley
Paterson—Elec. Service Repair Co.
Trenton—Lockwood Elec. Motor Serv.

NEW MEXICO
Albuquerque—Electric Motor Company
Powell Electric Co.

NEW YORK
Buffalo—Robertson Electric Co.
Jamestown—A. E. Westburgh
Mt. Vernon—H. A. Schrack, Inc.
New York—Consol. Elec. Motor Co.
Rochester—Vanderlinde Elec. Corp.
Utica—Mather, Evans & Diehl Co.
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Rocky Mount—Hammond Elec. Co.

OHIO
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Akron—A-C Supply Co.
Toledo—Romanoff Elec. Motor Serv.
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For more facts circle 548 on Reply Card

OPERATION & MAINTENANCE

(O and M begins on page 60)

system, even special ice machine oil will be too thick to drain readily.

Removal of this congealed oil from the low spots is facilitated by pumping 2 to 3 gallons of kerosene into the pocket. The kerosene is stable, insofar as evaporating into the system is concerned, and is highly efficient in cleaning oil off the coils.

The best procedure is to warm up the coil, drain out as much oil as will drain, and then pump in the kerosene. Leave the kerosene in the coil for 24 hours, under normal operation, then warm the coil and drain the oil-kerosene mixture. The kerosene, agitated by the boiling liquid ammonia, effects a scrubbing action inside the evaporator.

Oil should be drained once each week, with a kerosene rinsing every 1 or 2 months. Introducing the kerosene into the main liquor line will tend to clean out the strainers and valves in the line, but will not be as effective in the low spots, where the congealed oil is most likely to be concentrated.

Shut-off Valve from Scrap Parts

Contributed by Alvin Erickson

THE AVAILABILITY of a 100 hp stationary engine to drive an ammonia compressor was a boon to our power bill, but the use of natural gas as fuel was the subject of concern because of the lack of a safety shut-off valve. Using scrap parts, an ingenious valve was assembled which has functioned satisfactorily. The valve effectively shuts off the gas supply from the main, in the event that the engine stops.

Using the engine's oil pressure as the actuating medium, the valve was constructed of a bellows assembly from a temperature regulating valve. The bellows, when expanded by oil pressure from the line to the pressure gauge, holds a 1 in. Jenkins whistle valve open, permitting gas to flow from the main to the engine. Failure of the engine, with its resultant loss of oil pressure, retracts the bellows, shutting off the gas supply to the engine. As a secondary function, this valve also protects the engine itself from oil pump failure.

A by-pass valve is installed in the line for use in starting the engine.

This idea was submitted as an entry in the recent PLANgineering Contest. The judges, however, questioned the advisability of using this assembly for a safety valve. Mr. Erickson vouches for its operation and for its acceptability by the utility supplying the fuel gas. Do you have any comments? Send us your opinion or experience.—The Editors.

Design Blueprint for Clamp to Assemble Storage Racks

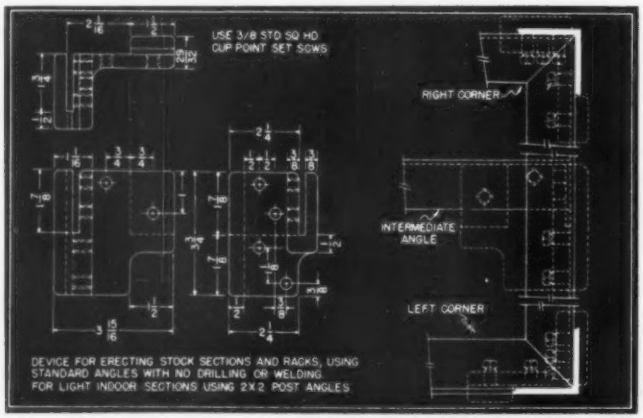
Contributed by Thomas H. Duffy

THE CLAMP shown in the blueprint is designed to be used with the proper lengths of angle iron in the erection of racks, stock sections or scaffolds for either permanent or temporary use. These structures can be built, enlarged or dismantled with a minimum of tools. Usually a wrench will suffice for any work to be done on the structure.

To construct a rack with the clamps, determine the height, length and width of the rack desired, and shear the angles accordingly. The ends of the horizontal member angles should be cut at a 45 degree angle, to form fitted corners. Attach clamps to the four post angles, starting at an equal distance from the bottom ends, and spacing them to make the shelf height required. Slip the horizontal angles into the clamps, and tighten the set screws. The basic framing will then be erected.

As many intermediate angles as are necessary between the front and back horizontal members can be added by adding clamps to the structure, to hold the angles. These intermediate angles should be sheared square, and with one leg cut to butt against the horizontal member, so that the top surface of all angles is uniform.

Intermediate post angles can also be added, so that a continuous line of racks may be constructed. In installations where solid wall bins are desired, the assembled rack framing can be covered with sheet metal, attached with self threading screws.


USE 3/8 STD SQ HD CUP POINT SET SCWS
RIGHT CORNER
INTERMEDIATE ANGLE
LEFT CORNER
DEVICE FOR ERECTING STOCK SECTIONS AND RACKS, USING STANDARD ANGLES WITH NO DRILLING OR WELDING
FOR LIGHT INDOOR SECTIONS USING 2X2 POST ANGLES

Clamp design and dimensions are shown at left; construction methods at right

Keep Compressed Air Lines Tight

COMPRESSED AIR, as emphasized by its increased use, has proven itself among the foremost production power media.

Maximum benefits are being obtained by those who keep a close vigilance over their air systems. Conversely, where reasonable maintenance is not conducted, a loss in production and dollars is experienced.

According to the findings of the Compressed Air and Gas Institute, one of the greatest production robbers is low pressure.

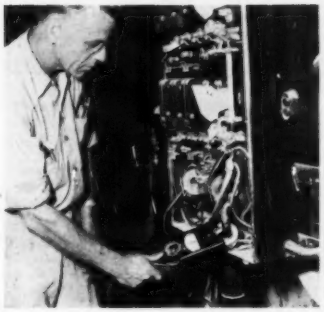
It has been found that if the pressure at a pneumatic tool falls from 90 psig. to 70 psig., production output of that tool may drop as much as 35 per cent. Somewhat more specific is the case of the air motors which are used extensively to power air tools and devices. Air motors offer more horsepower per unit weight than other comparable power sources. Because compressed air systems in most plants utilize pressures between 90 and 110 psig., air motors are designed to operate within those working pressures. An air motor, built to operate at 90 psig., however, will lose 25 per cent of its capacity if line losses drop the pressure to 70 psig.

First inclination when air pressures drop may be to place the blame on insufficient compressor capacity. A check of the air distribution system, first, may save the cost of new compressor equipment.

One of the principal causes of low air pressure is the development of leaks in the distribution system.

Checking the air distribution system for leaks is a relatively simple matter. The most likely locations of small leaks are around valve stems, hose connections, unions, drains, home-made blow guns, and lines leading to inoperative tools. Of course, the entire system should be checked with particular attention to

TESTING TIPS for the maintenance of plant equipment



Firestone Tire and Rubber Company Saves Four Hours With G-E Power-factor Meter

"The AK-3 enables us to gain very definite savings in time, money, and manpower. We now save four hours per reading over the use of the analyzer method by using the new G-E hook-on power-factor meter," reports G. H. Kaufman of the Firestone Tire and Rubber Company. Mr. Kaufman is chief field electrician at the Los Angeles plant where tires, rubber products, and fuel cells are manufactured.

DIRECT READING

Since the AK-3 is direct reading, no calculator cards or interpolation is required: just clip on the voltage leads, clamp the hook around the line, and rotate the dial with your thumb to get the reading.

if your power factor is now	you can release this much extra capacity	with this many capacitors for each 100 kw of load
65%	34%	84 kvar
70%	29%	69 kvar
75%	23%	55 kvar
80%	17%	42 kvar
85%	11%	29 kvar
90%	5%	15 kvar

(Power factor is raised to 95%. New load is at original power factor.)

When making capacitor surveys you'll find the AK-3 a valuable time saver. The table above shows what you can expect from adding needed capacitors to your feeder lines. Accurate to within 0.05 PF the AK-3 can be used on a-c circuits with voltages from 100–600 volts and currents from 15–600 amperes. Available from stock the AK-3 is $87.00*

*Mfgs. suggested retail price.

Lower Price — Wider Range — Pointer Stop New G-E Hook-on Volt-ammeter Features

Now available, the new General Electric AK-1A hook-on volt-ammeter boasts a wider range and pointer stop at the new low price of $66.75*. A positive-action selector switch gives ranges of 0–7.5/30/75/300/750 amperes and 0–150/300/750 volts a-c. The new pointer stop is easily adjusted to permit reading of motor-starting currents.

READ AMPS QUICKLY

This versatile portable instrument measures current by simply hooking the jaws around any insulated or uninsulated a-c conductor—no cutting into line, no interruption of service.

CHECK VOLTS EASILY

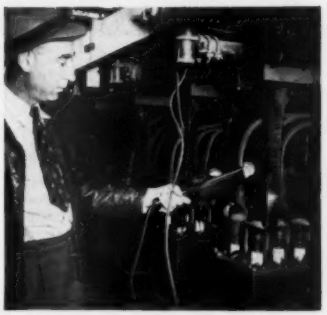
For voltage readings you simply flick the selector switch to the desired scale, connect the voltage lead to the terminals, and then clip the extra-large alligator clips across the line.

HIGHLY ACCURATE

The AK-1A is magnetically shielded so that 500 amperes in a conductor one foot away from the transformer causes negligible effect on the 300- and 750-ampere ranges, and less than one percent error on the other current scales. Dovetail joint on the magnetic jaws reduces errors from dirt that may accumulate in the air gap. Errors caused by imperfect closing are held to less than two percent, where the ordinary butt joint might cause a 10 percent error. For more information, write for Bulletin GEC-901, or to order the AK-1A specify Catalog No. 549X95. Price: $66.75*

Steel Plant Uses Hook-on Wattmeter To Help Maintain 24-hour Operation

The electrical foreman of a West Coast steel plant reports satisfaction with his G-E AK-2 hook-on wattmeter. "We never get a shutdown here—operate 24 hours a day and in order to get readings without interrupting service we use the G-E hook-on type instruments." This foreman is using the AK-2 to determine the kilowatts going through an auxiliary feeder to a 24-inch mill; he can thus plan changes to be made during holiday periods.



EASY TO USE

Maintenance men appreciate the simplicity and extreme portability of the AK-2. Power is measured by clamping the jaws around any a-c line up to two inches in diameter. The two potential leads are connected across the line and watts, (vars in a balanced three-phase circuit) are read directly with an accuracy of ±3% full scale. The AK-2 will measure up to 300 kw, on ranges 15–600 amperes, and 100–600 volts. Price $84.75*

When ordering bulletin, write to Section 602-241, General Electric Company, Schenectady, N. Y.

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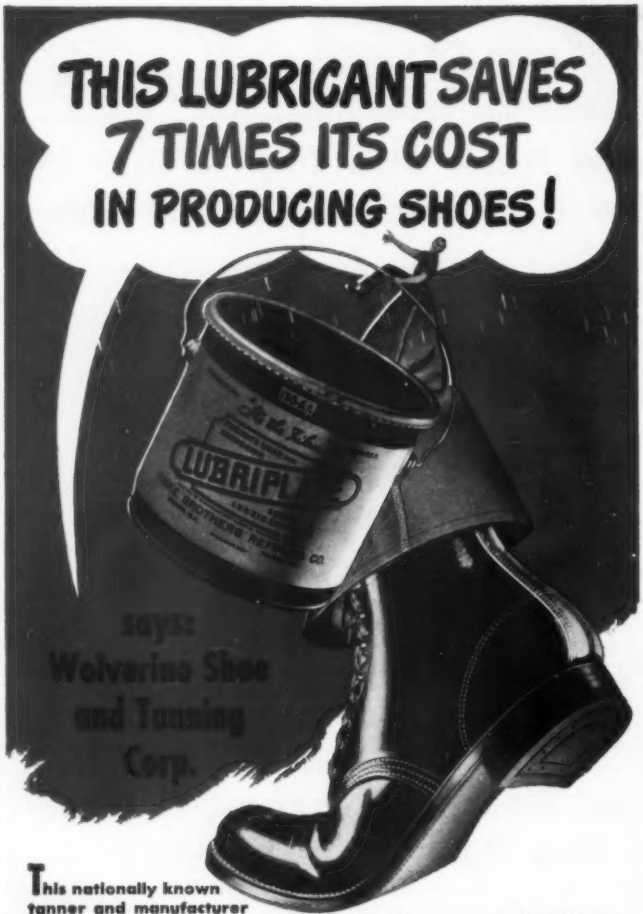

This nationally known tanner and manufacturer of work shoes and gloves writes us...

"... You recommended to us LUBRIPLATE NO. 100 for lubricating the chain drive on our paddle wheels which turn the hides immersed in a solution in concrete vats. The chain, during use, is always soaked. The solution is sometimes acid and sometimes caustic. Up to the time of your recommendation, we had not found any lubricant that would stay on the chains for any appreciable time.

"Heretofore, the average life of a chain was approximately one year. We have applied LUBRIPLATE to these chains every two weeks for two years. Since then, not one new chain has required replacement, and they are still going strong.

"At this time it appears that *for every dollar we have invested in* LUBRIPLATE, *we have saved seven dollars* in chains with actual savings still to come."

WOLVERINE SHOE & TANNING CORP.
Rockford, Michigan

You, too, can enjoy the savings made possible with LUBRIPLATE Lubricants. There is a LUBRIPLATE product for every industry. LUBRIPLATE reduces friction and wear, prevents rust and corrosion and is most economical to use. Write today for case histories of savings made possible by the use of LUBRIPLATE Lubricants in your industry.

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LUBRIPLATE the Modern Lubricant

For more facts circle 550 on Reply Card

OPERATION & MAINTENANCE

(O and M begins on page 60)

the above and to lines which are subjected to unusually rugged treatment.

Inspection should be made monthly.

Plant maintenance departments have come up with many simple and rather unique ways to check leaks. Most frequently used are the lighted candle or the solution of soapy water which is brushed around suspected areas. One manufacturer puts essence of peppermint into the air system, for detection of the slightest leak by odor. Also available for checking air line leaks is a hypodermic needle-gauge device. The needle, mounted in a pressure gauge, can be inserted in any air line, to check pressures at any distance from the source. The needle hole seals itself as the needle is withdrawn.

Cost of Air Line Leaks

Size of Opening (in.)	Cu ft lost per mo. at 100 psig nozzle coeff. 0.65	Cost at $0.07 per 1000 cu ft lost
3/8	6,671,890	467.03
1/4	2,920,840	204.46
1/8	740,210	51.81
1/16	182,272	12.75
1/32	45,508	3.19

Still another method, rather ingenious, is the use of what formerly may have been considered nothing more than a youngsters' toy. A small siren-like whistle, activated by air flow, is passed over the lines, a siren noise indicating a leak.

Regardless of what method is adopted, when leaks are found, patch them immediately.

Some of the leaks may be very small, appearing trivial in themselves. But such leaks may be numerous and have a high accumulative effect. Actually, these leaks spell a very definite dollar loss, which more than justifies scheduled maintenance of air systems.

Sectional Plunger Saves Costs

Contributed by A. J. Ploudre

AS A DIRECT RESULT of the severity of service to which one of our motor driven triplex pumps was subjected, it was necessary to replace the three plungers at frequent intervals. The plunger replacement required the services of two men, since the drive end of the pump had to be dismantled to do the job.

In operation, only the end of the plunger that entered the pumping chamber was subjected to erosion

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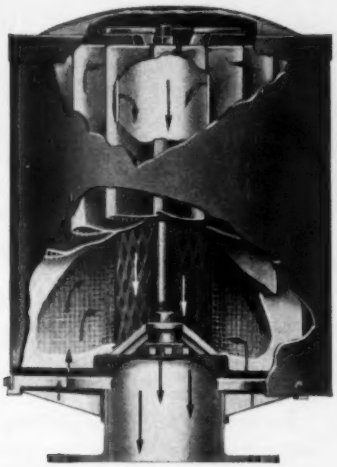
They give us positive protection . . . They won't need regularly scheduled maintenance . . . They're easy to clean on the job . . . Efficient over a wide range of loads . . . They're not affected by temperature change . . . There's no oil carry-over

OUR EQUIPMENT WILL LAST LONGER!"



MODEL D
Intake Filter

Industrial engineers everywhere know that Staynew's *Positive Protection* lengthens equipment life. From compressors to generators . . . from blowers to internal combustion engines, Staynew Intake Filters stop dust and dirt from entering through air intakes, causing carbon accumulation and needless wear. And Staynew Filters frequently operate two or more years *without maintenance.* When cleaning is indicated, a brush or simple vacuum cleaning insert is all you need. Specify Staynew and increase productive time.

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The DUALOC Ending insures sling strength equal to the FULL catalog strength of the wire rope, and the "Registry" specification requires that all fittings have strength equal to that of the wire rope. These are the basic reasons why ACCO *Registered* DUALOC Slings have set industrial sling standards.

You can get DUALOC Slings and Fittings from the stock of your ACCO Sling distributor. See him today or write our nearest district office for his name.

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AMERICAN CHAIN & CABLE

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New York, Odessa, Tex., Philadelphia, Pittsburgh,
San Francisco, Bridgeport, Conn.

For more facts circle 552 on Reply Card

OPERATION & MAINTENANCE

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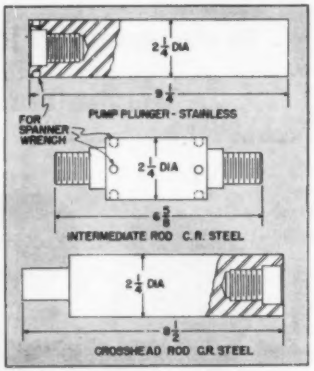
and wear. However, the practice had been to replace the entire plunger rod, with considerable loss from scrapping the stainless steel rods.

To reduce pump maintenance costs in both manhours and material charges, a new rod was designed



Sections of pump plunger rod, showing threads for fitting lengths together

consisting of three sections, screwed together. Only that part of the rod which came in contact with the packing and pumped liquid was made of stainless steel.

Replacement of a worn pump plunger is now completed by one man, without the necessity of dismantling the pump. The two sections of the rod not affected by erosion and wear are made of cold rolled bar stock, with resultant material cost reduction. Further material savings have resulted in the replacement of only ⅓ the metal formerly replaced during each plunger change. Now, only the stainless steel portion of the sectional rod is replaced.

Polishing With Inflated Grinders

POLISHING STAINLESS STEEL down to a No. 4 finish is a problem at the Claus Mfg. Co., Cleveland, Ohio. However, the introduction of air-inflated grinders for the job has cut the time required for this finishing operation almost in half.

Deep drawn stainless steel sink bowls, with a 2B finish, are welded into sink tops with a No. 4 finish. Using the inflated grinders, the finishes on the two component parts are matched at twice the speed achieved with ordinary hard grinding wheels.

The grinders consist of a rubber drum mounted on a core assembly.

Photo: Nu-Matic Grinders, Inc.

Operator gets "air-cushioned" grinding effect for polishing rounded corners

The operator slips an abrasive band over the drum, and then inflates the drum with air, the pressure ranging from 3 to 10 psi. The resiliency of the grinder head affords greater abrasive contact area, eliminates chatter and bounce, and enables the grinder operator to polish contours more efficiently.

Tool Boxes on Wheels

Contributed by Robert Dryden, Allis-Chalmers Manufacturing Co.

THE LARGE PLANT AREAS covered by the plant maintenance force required the men to travel long distances to and from a job.

As an aid in expediting these travels, tool boxes were designed

Metal tool box fitted with wheels and retractable handle speeds job travel

with rubber-tired wheels and retractable handles which the mechanics could pull to the job site.

Aside from the time saved in transporting tools around the plant, a considerable fatigue problem has been lessened by relieving the mechanic of the need to carry heavy tool boxes.

Fused Ammeter Connection

WHEN USING AN AMMETER to measure the current in a circuit, normal circuit overcurrent protection may be maintained without the need of disconnecting circuit wiring to make changes. A fuse adapter, made from

Army Type **WRIGHT SAFEWAY**

● A steel hand hoist with compact, adjustable suspension and trolley to fit various width I-beams. Designed for low overhead. Easily converted to 2-wheel geared trolley unit.

Longer-life features include: steel in all load-supporting parts; load sheaves with five formed pockets; automatic load chain lubricator; alloy steel load chain; swiveling drop-forged load hook; alloy steel, machine-cut gears; fully enclosed, self-oiling gear case.

See your WRIGHT distributor or write for Bulletin **DH-269.**

ACCO

WRIGHT HOIST DIVISION
AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

WRIGHT
Hoists
Trolleys
Cranes

For more facts circle 553 on Reply Card

HEAT ON WHEELS

Ready to work in your plant!

HERMAN NELSON PORTABLE HEATERS

Herman Nelson Portable Heaters provide quick, safe, economical heat for emergency, stand-by and spot heating purposes. These rugged units are self-contained—can be easily moved and put into operation by one man. Suitable for use indoors or outdoors.

You can avoid layoffs, speed work in cold areas, provide temporary heat for warehouses with Herman Nelson Portable Heaters. They also provide auxiliary heating for those extra cold days or during loading or unloading operations and for scores of other heating and drying jobs.

HERMAN NELSON ECONOMY MODEL

Priced lower for the smaller jobs. Capacity 125,000-190,000 BTU/hr. Oil fired, electric powered. Costs only 19¢ per hour to operate. Other models available—electric or gasoline powered with capacities to 450,000 BTU/hr.

The only completely safe portable heater that uses flexible ducts to spot heat where most needed—and remember, only uncontaminated air heaters are absolutely safe!

Low initial cost . . . low operating cost. Herman Nelson Portable Heaters pay for themselves during the first season. For full information, mail the coupon below, today.

Herman Nelson Division, Dept. 83
American Air Filter Company, Inc., Moline, Illinois

Gentlemen: Please send information about Herman Nelson Portable Heaters; also my free copy of HEAT-ON-WHEELS FOR INDUSTRY.

Name_____

Title_____

Company_____

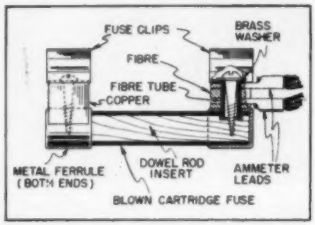
Address_____

City_____ State_____

For more facts circle 554 on Reply Card

OPERATION & MAINTENANCE

(O and M begins on page 60)



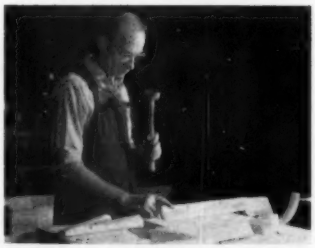
Fuse adapter provides means of safely channeling current through main circuit and ammeter circuit simultaneously

a blown fuse, can be used in the circuit. The adapter is substituted for one of the circuit fuses, which is replaced in the clips of the adapter.

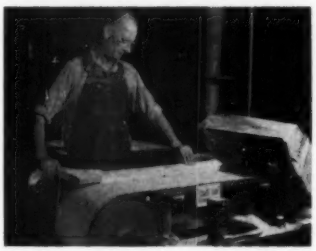
The ammeter circuit is quickly made a part of the main circuit, and the fuse protection is maintained during the current measurement.

Belt Sanding Fixture for Wedges

A HOLDING FIXTURE, designed to be used with a coated abrasive belt, has doubled the rate of finishing paper-roll-holding wedges, and cut machine operator fatigue in half.



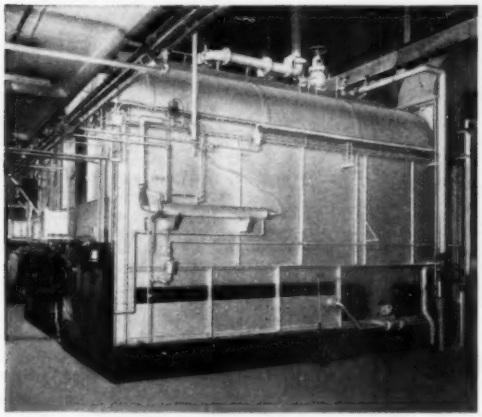
Wedges are temporarily secured to fixture by driving them onto wood screws



Wedge sanding is simple process. Curved handle keeps hand free of belt

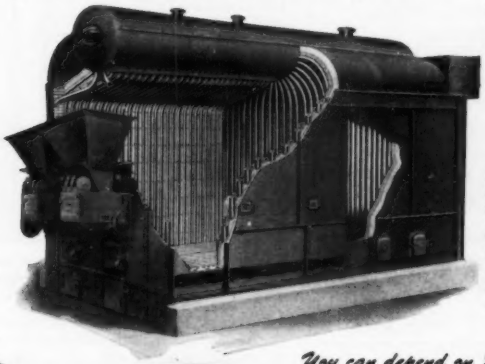
Used in the machine room at Behr-Manning, Troy, N. Y., the fixture is a length of 2 by 4, notched to receive 5 wedges, and fitted with a curved handle. Two wood screws, driven through from the flat side of

3 Erie City VL's Pay Off in 18 Months at Kaiser-Frazer



Above: Battery of 3 Erie City "VL's"—oil and gas fired—that replaced 7 obsolete coal fired units at a Detroit plant of Kaiser-Frazer Corporation.

Below: Sectional view of standard factory-assembled Erie City "VL" boiler with Erie City spreader stoker. Available for all firing methods.



Before modernization of the E. Jefferson Avenue Detroit plant of Kaiser-Frazer, seven coal fired boilers dating from 1911 and 1920 were in service. The new power plant consists of 3—20,000 pounds per hour Erie City "VL's" for oil and gas firing. They supply steam for heating and process.

While the cost of steam, using coal, would be about 5 cents less per thousand pounds, the use of oil and gas reduced capital investment due to the elimination of new coal storage and allied equipment. Average boiler efficiency of the 3 new Erie City "VL" boilers is 81.5%. Power house labor was reduced from 14 to 6 men. The combined savings from greater efficiency, minimum maintenance and reduced labor costs is expected to pay for the new boiler installation in 18 months.

Are you wasting fuel dollars with worn out boilers? Let Erie City engineers recommend steam generators that will pay for themsleves out of savings.

20 Page Catalog describing Erie City "VL's" in detail shows its easy adaptability to all firing methods and illustrates its superior design features. "VL's" are factory assembled to 300 hp. and field erected in larger sizes. Ask for Bulletin SB-43.

You can depend on Erie City for sound engineering

ERIE CITY
112 Years In Steam Generation

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

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Rigid KENNEDY Inspection Guarantees Fittings Free of Leaks, Burrs and Scales

KENNEDY MALLEABLE-IRON screwed fittings are made with tough, close-grained iron, tested to 43,000 psi. Carefully controlled annealing prevents splitting or cracking under almost any distortion forces. Uniform hot-dip galvanizing assures a heavy coating that will not chip or flake. Precision machining provides exact alignment . . . speeds installation time.

KENNEDY CAST-IRON screwed and flanged fittings, are made with tough, close-grained metal *more than* 50% *stronger* than ordinary gray iron. Precision threading and accurately machined flanges help you get strong, tight joints easily. The complete Kennedy line also includes cast-iron sprinkler and drainage fittings, and cast-iron flanges.

KENNEDY BRONZE fittings with tensile strength of 34,000 psi are individually tested to 100 lbs. air pressure under water to insure freedom from leaks. Available rough or polished in all standard types and sizes.

WRITE FOR BULLETIN 104

THE KENNEDY VALVE MFG. CO. • ELMIRA, N.Y.

Est. 1877

VALVES • PIPE FITTINGS • FIRE HYDRANTS

For more facts circle 556 on Reply Card

OPERATION & MAINTENANCE

(O and M begins on page 60)

the fixture, project from each notch. The wedges are placed in the notches, and driven onto the projecting screws to hold them temporarily while being sanded.

On the platen between the sander drums, the wedges are bottom smoothed and the bottom corners rounded. No further finish is required, and the entire operation is completed in about 35 seconds.

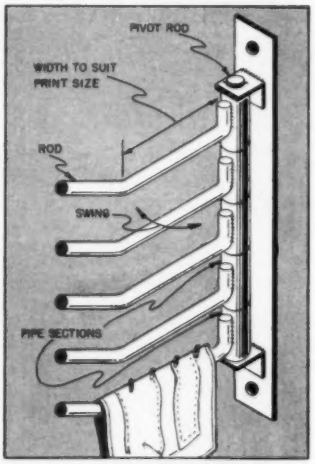
Wall Rack for Blueprint Storage

Contributed by H. N. Josleyn

A HANDY BLUEPRINT HOLDER, serving as a temporary storage file, is easily made in the shop.

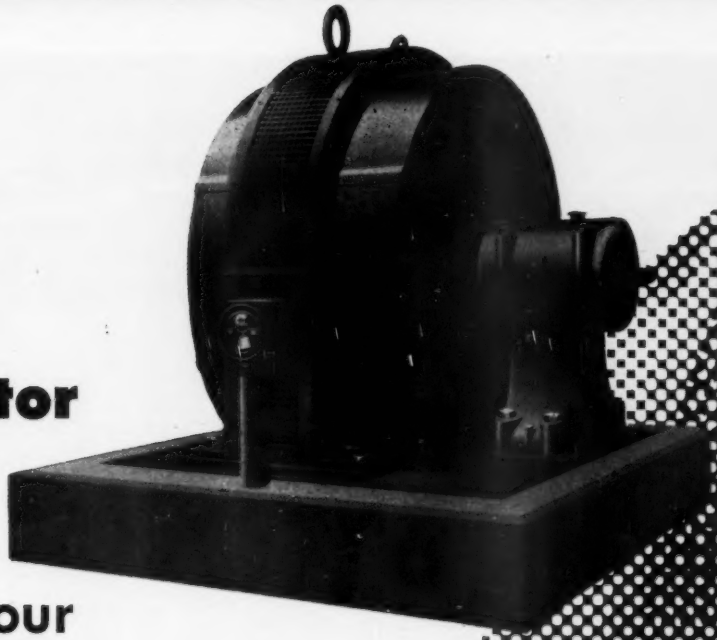
Using as a base a length of ¼ in. by 2 in. flat iron, weld two pieces of angle iron, with one leg drilled, in position to receive the shaft of the rack. Space these angles so as to accommodate loosely the number of arm assemblies desired. Cut and bend the rods, and weld them to short lengths of pipe as shown on the sketch. The arms should be long enough to extend about 2 in. past the widest blueprint to be hung.

The prints are folded, or fastened



Construction detail shows handy wall rack with 5 arms to hold blueprints

together at one edge, and hung over the rods. When hung, the prints can be swung against the wall, out of the way. These holders are handy in maintenance offices, construction offices, or any place where blueprints are used away from their permanent storage file. Rapid identification of each print is facilitated by staggering each arm position.



this **factor** figures in your future

Whatever your drive problems, the motor with the Fairbanks-Morse Seal can be an important factor in the future success of your motor-driven equipment.

For example, when you need synchronous machinery, look for the F-M Seal—as have users of over 5,000,000 horsepower of this type of equipment. That Seal is your assurance of pioneered improvements, proved design, quality manufacture and top performance—factors to figure in your future.

When you look for electric motors, look for the Fairbanks-Morse seal. For over 120 years it has stood for the finest in manufacturing integrity—to *all* industry. Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the best

ELECTRIC MOTORS AND GENERATORS • MAGNETOS • FARM MACHINERY
DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES
HOME WATER SERVICE EQUIPMENT • RAIL CARS

Comfort for Industry*

This is a picture of *good* industrial lighting. It's good lighting because it's *comfortable* lighting.

Notice the amount of light that reaches the ceiling. The fixtures throw 10% of their light upward through slotted reflectors. That cuts down the "brightness contrast" between the light source and the surrounding ceiling—a common cause of eyestrain and nervous fatigue.

A man can work faster, longer and more accurately under this kind of lighting—because he can see better and *more comfortably.*

The fixtures? They're Day-Brite CFI DAY-LINE's. Put them in *your* plant and they'll help increase your production . . . instead of your expenses.

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

285

*CFI means "Comfort for Industry." The CFI DAY-LINE is designed to give you 10% up, 90% down distribution of light, the first practical solution to the need for more comfortable industrial lighting. Available in Slimline or standard Fluorescent, the CFI DAY-LINE gives you such premium advantages as Turret sockets, all-white porcelain enamel reflectors and improved, stronger construction—at competitive prices. Write for Bulletin OD-568. Day-Brite Lighting, Inc., 5439 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

For more facts circle 558 on Reply Card

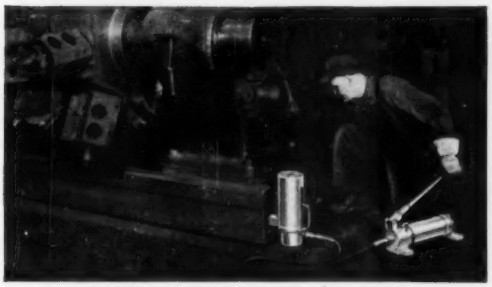
"...this book has licked some of our toughest problems!"

BLACKHAWK IDEA BOOK is already paying big dividends for thousands of men in industry

HOW would you like to put the experience of hundreds of industry's ablest men to work for you?

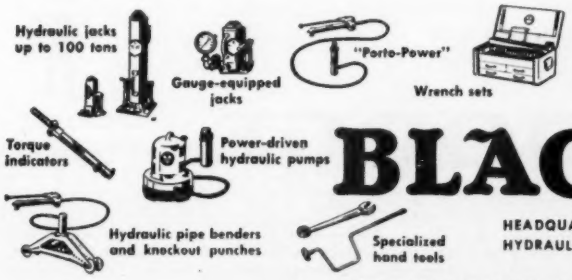
That's exactly what you can do by getting your copy of Blackhawk's 64-page IDEA BOOK. It's loaded to the margins with shortcuts developed throughout industry using Blackhawk Hydraulic Tools and Hand Tools. You'll see pictures and applications that can bring you spectacular savings in time, money and materials.

IDEA BOOK shows new production and maintenance methods . . . advanced testing and inspection techniques . . . cost-cutting construction and field service procedures. You'll find how to bring ease and safety to hundreds of jobs that are now back-breaking or downright dangerous. So get it . . . *today!* Don't pass up this sure way to become an invaluable Idea Man yourself.



FOR MAINTENANCE—Throughout plant engineering, Blackhawk Hydraulic Tools and Hand Tools make tough tasks easy . . . save hours of time . . . do better work.

FOR PRODUCTION — Power-driven or hand-operated hydraulic pumps, plus rams and valves, provide quick, low-cost power for temporary or permanent set-ups.



GET YOUR FREE COPY OF IDEA BOOK from "The Man Who Knows" — your nearby industrial supply distributor. He'll also be glad to give you full facts on his Blackhawk products. If he cannot supply IDEA BOOK, write on your company letterhead to Blackhawk Mfg. Co., Dept. M-49112, Milwaukee 1, Wis.

BLACKHAWK®

HEADQUARTERS FOR THE WORLD'S most complete line of HYDRAULIC TOOLS . . . PLUS INDUSTRIAL HAND TOOLS

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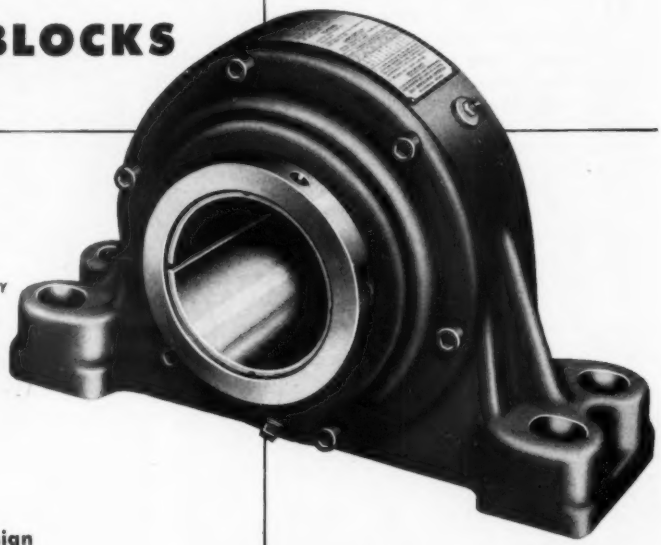
NEW

DODGE-TIMKEN ALL-STEEL PILLOW BLOCKS

HEAVY DUTY CAPACITY!

●

LESS SPACE! LESS WEIGHT!



A JOINT ENGINEERING DEVELOPMENT BY DODGE AND THE TIMKEN ROLLER BEARING COMPANY

- All-Steel construction
- A new Timken bearing design
- High radial and thrust capacities
- Compact—minimum dimensions
- Minimum weight with maximum strength
- Fully self-aligning with spherical outer race
- Both expansion and non-expansion types
- Adapter mounting, proven through the years
- Double piston ring seals
- Sealed both on and off the shaft
- Fully assembled, permanently adjusted, lubricated and sealed at the factory

Here are the bearings for industry's toughest jobs. High radial and thrust capacities. Stamina to take heavy shock loads. And all-steel construction packs this load-carrying capacity into less weight and less space. Engineers are already specifying "Dodge-Timken All-Steel" for some of America's largest projects. Write for details and delivery dates, or call your Dodge Distributor.

DODGE MANUFACTURING CORPORATION
2700 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

DODGE
of Mishawaka, Ind.

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS

For more facts circle 560 on Reply Card

FOR SUPERIOR Coatings

Think first of the coatings that last!

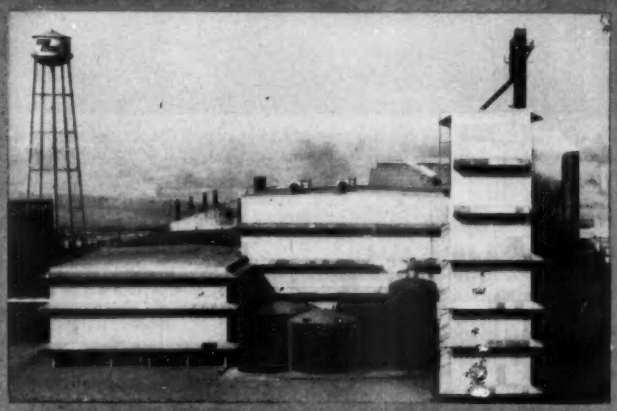
INSUL-MASTIC

Corrosive conditions in paper pulp mills and steel mills are terrific. The atmosphere in these plants is charged with acids and alkalis that eat the heart out of steel in a few years—or even a few months. INSUL-MASTIC *superior* COATINGS are giving protection that will last for years to this costly metal equipment in these extremely corrosive places.

In other industries also, Insul-Mastic Gilsonite Coatings are being specified because of their resistance to chemicals and moisture vapor; their minimum shrinkage and great temperature range.

For long coating life under severe conditions specify INSUL-MASTIC *superior* Coatings.

ST. REGIS PAPER CO., *by using Insul-Mastic Type "D", the Coating that Insulates and Protects,* will prevent up to 65% of heat loss from these black liquor tanks and foam tank. Many other vessels throughout this modern new mill at Pensacola, Florida are coated with Insul-Mastic for corrosion prevention as well as insulation.



Insul-Mastic Corporation
OF AMERICA
1163 OLIVER BUILDING · PITTSBURGH 22, PA.
Representatives in Principal Cities

INSUL-MASTIC COATINGS
CORROSION PROOFING
WATERPROOFING
VAPOR SEALING
INSULATION

For more facts circle 561 on Reply Card

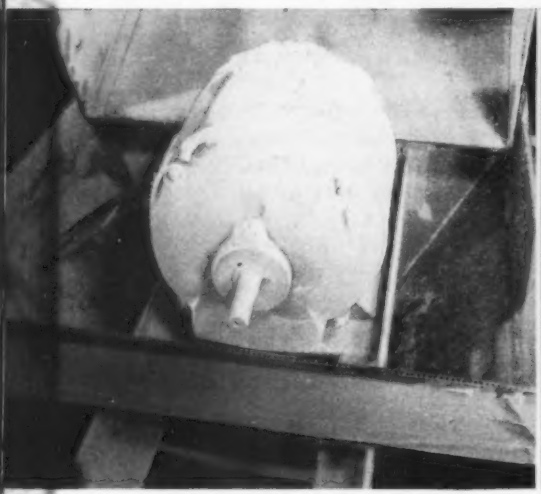
Tests Like This Show The Stamina of R & M "All-Weather"* Motors!

The standard R & M "All-Weather" open motor shown below was placed in a specially built test chamber in which it was blasted with highly abrasive 200-mesh powdered quartz.

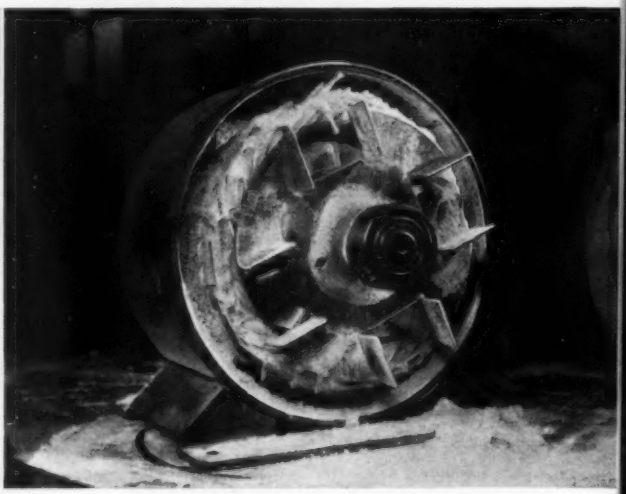
After 2,860 hours continuous operation, it was torn down for examination. In spite of the tremendous amount of quartz deposited by air circulating through the motor, this is what was found: insulation showed no damage; effective thru-ventilation had kept all air-passages clear and unblocked; grease in the fully-sealed pre-lubricated ball bearings was not contaminated—effective bearing seals had kept grease in, abrasive out.

After 8,000 hours in this "snow storm" of quartz the motor is still going strong, even though this accelerated test is subjecting it to treatment that would *never be encountered* in normal applications.

This is the kind of stamina *you can expect* with R & M Motors working for you . . . this is the performance for which R & M "All-Weather" Motors are famous!



This R & M "open" type motor has operated 8066 hours while being blasted with highly abrasive powdered quartz.



Large deposits of quartz were found throughout the motor, yet insulation is sound, bearings are clean.

R & M MAKES THEM ALL!
Explosion-Proof; Totally-Enclosed; Single Phase; Direct Current; Motor Generators; Frequency Converters; Chemical Plant Motors; Close-Coupled Pump Motors; Jet Pump Motors; Motor Parts.

If you're looking for the one motor with real staying-power—even on the toughest jobs—if expensive "down-time" due to motor failure is costing you money, write for Bulletin 400 *today*. It tells the full "All-Weather" story—shows you the many "extras" R & M offers at *standard prices!* No obligation.

If it's an R&M, it's the Right Motor!

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

"All-Weather" is the trademark of Robbins & Myers, Inc.

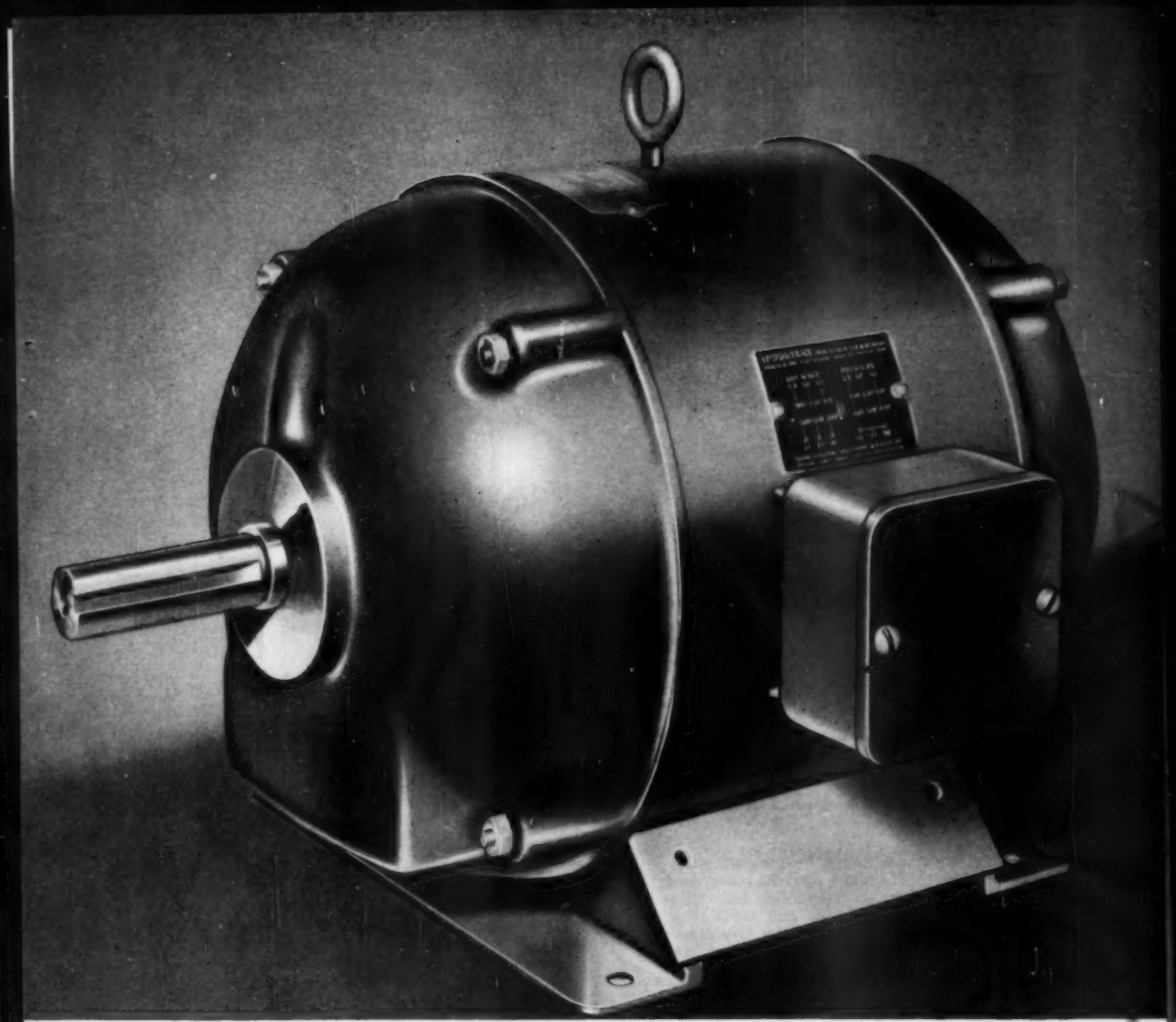
Fractional & Integral h.p. Motors & Generators

Electric Fans

Electric & Hand Hoists & Cranes

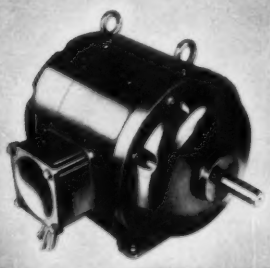
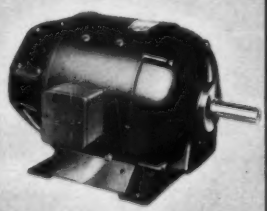
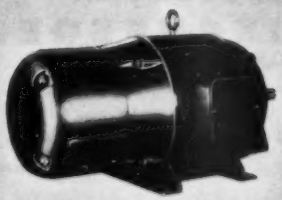
Moyno Pumps

Propellair Industrial Ventilating Equipment



R&M "All-Weather" polyphase motors, 1 to 125 h.p.

1 to 125 h.p. . . . R&M has the motor you need!

Explosion-Proof Totally-Enclosed Fan-Cooled, and Chemical Plant Motors, 1 to 40 h.p.	Direct Current 1 to 7½ h.p.	Capacitor Single Phase, 1 to 7½ h.p.	Frequency Converters, 2½ to 15 K.W.
			

P&H

TRAV-LIFT CRANES

HARNISCHFEGER CORP. : MILWAUKEE WIS.

HEAVY LOADS AWAY!

one man moves up to 15 tons

It's *100%* easy handling of heavy loads with the Trav-Lift! No out-of-reach spots, no traffic-jam delays, no rehandling . . . *this way!* Lift, transport, lower and stack materials *anywhere* within an entire bay area. It's all done through the air, all by just *one* man.

That's why, when requirements call for cranes, P&H Trav-Lifts are first choice for fast handling. In the Trav-Lift, you get a custom-made crane at "stock" prices . . . because P&H uses standard money-saving designs . . . because P&H builds the entire unit, electrical equipment included.

You can have the Trav-Lift with cage or floor control . . . with various spans and lifting speeds and in capacities to 15 tons. It's another quality product of P&H . . . America's largest builder of overhead handling equipment. Your call to P&H will bring an expert anxious to help with your handling problems.

handle it "thru-the-air" at lower cost

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

4400 West National Avenue, Milwaukee 46, Wisconsin

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

For more facts circle 563 on Reply Card

DARE TO COMPARE!

See the Life-Linestarter® Strip-Down Test for Stepped-Up Maintenance

Easier Installation . . . Because of standard NEMA mounting; straight-through wiring; pressure-type connectors; drawn cover.

Easier Maintenance . . . Because of fewer moving parts; all front-removable. So simple that you can actually do it BLINDFOLDED.

Longer Life . . . The chief electrician of a southern mill* says: "Our Life-Linestarters started and stopped the motor 5,700 times daily. After at least a million cycles, contacts showed little wear." J-30098

*Name on Request.

WESTINGHOUSE

Life-Linestarter

SEE THE STRIP-DOWN TEST

AT NO OBLIGATION!

It will open your eyes to Life-Linestarter's Stepped-Up Maintenance and Performance. Mail the coupon today!

Westinghouse Electric Corporation
Box 868, Pittsburgh 30, Pa.

Name_____

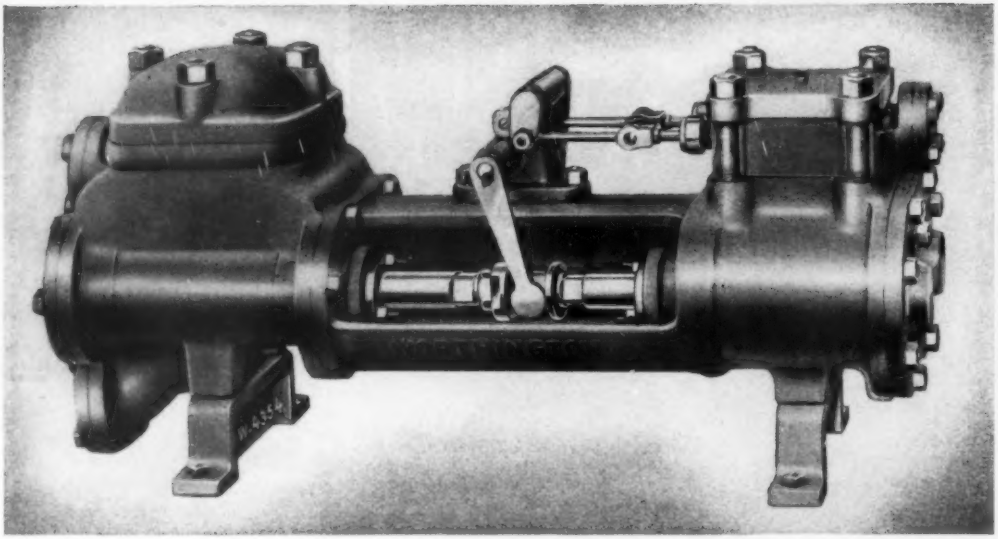
Title_____

Company_____

Address_____

City_____ State_____

This is a throttle valve



. . . And so is this!

You may think you're getting the most out of the steam in your plant—but here's an idea that's slipped by the best of them.

If your plant uses steam, you undoubtedly use throttle valves—and you undoubtedly use pumps. But have you ever considered using a pump that can do the two jobs more economically than one?

A steam pump can do just that—as a pump it pumps, and as a steam "consumer" it serves nicely as a throttle valve to reduce the pressure with only a small loss in heat energy. Big point is that it does all this on power that's otherwise wasted. THE POWER'S THERE, WHY NOT USE IT?

MODERN WORTHINGTON STEAM PUMPS OFFER YOU ALL THESE ADVANTAGES

THEY'RE FLEXIBLE because capacity can be easily varied. And exhaust steam can be used for process work or heating.

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P.2.5

The World's Broadest Line Assures You the Right Pump for Every Job

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Introducing smoke into the schoolroom model to make air flow visible. Ronald Chatham photo

VENTILATION GOES TO SCHOOL

Texas Engineering Experiment Station tests show what kinds of windows and window detailing provide the best warm-weather ventilation

IF SCHOOLROOM—or plant—ventilation is a problem that concerns you, here's a report from the pages of "Architectural Forum" we know you'll want to read.

In it, you'll see how sun hoods, window types, and outlet wall openings effect the over-all air flow pattern throughout the room . . . how, with proper design, schoolrooms can be made comfortable—even in hot weather.

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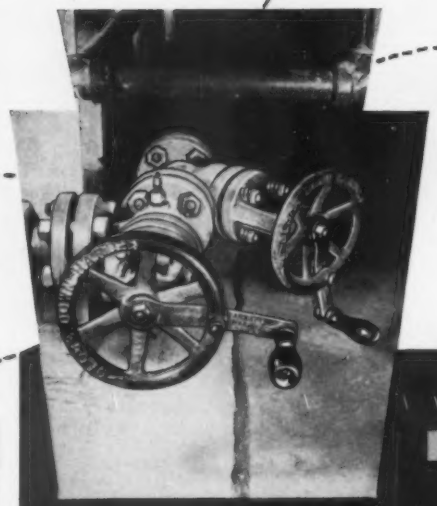
IN PENNSYLVANIA, TOO, IT'S YARWAY



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BOILERS AT NEW EHRET PLANT EQUIPPED WITH YARWAY SEATLESS BLOW-OFF VALVES

At the Valley Forge, Pa., plant of Ehret Magnesia Manufacturing Co., Yarway Seatless Blow-Off Valves guard boiler blow lines. An engineering "showplace", this modern push-button plant is one of more than 15,000 plants from coast-to-coast that rely on Yarway Blow-Off Valves to keep blow-down lines "drop tight".

Yarway Seatless Valves feature the balanced sliding plunger that is so easy to operate. It cannot be opened or closed too quickly — no water hammer. When open, no obstructions hinder a free flow of blow down through the valve.

Most important, one of the commonest sources of blow down troubles has been eliminated. *There is no seat to score, wear, clog or leak.*

Whatever your blow-off problem, there is a Yarway man nearby to help. Call on him.

For blow-off valve information write for Yarway Bulletin B-425 (pressures to 400 psi) or Bulletin B-433 (pressures to 2500 psi).

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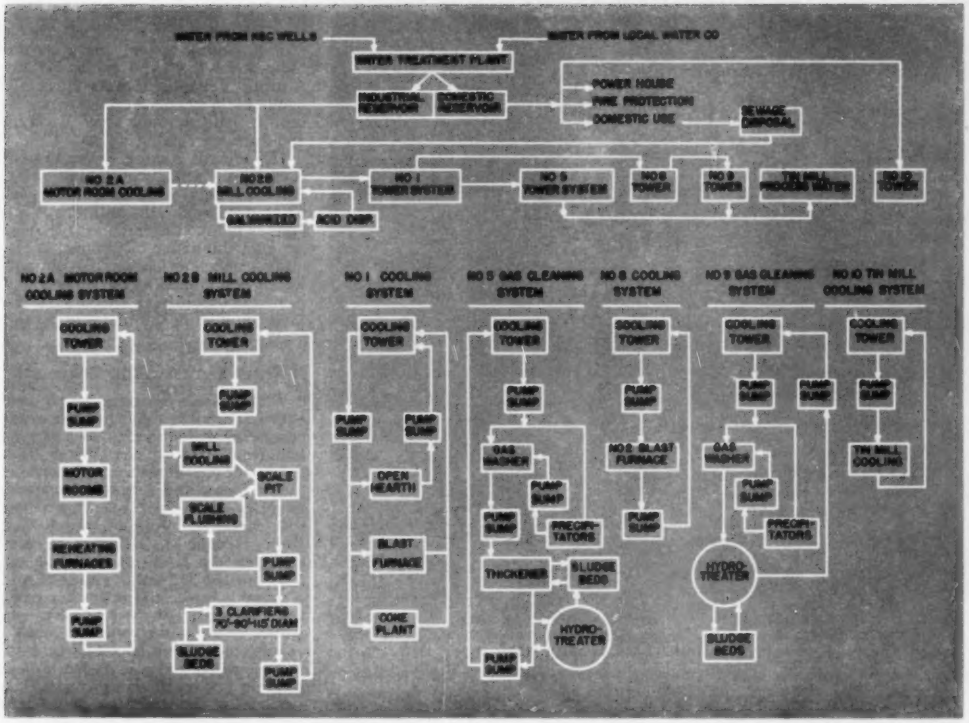


A schematic layout of the water system which permits the Kaiser Co. to use only 2.8 per cent make-up water daily

Only 2.8 Per Cent Make-Up Water Required Daily at Kaiser Steel

The company circulates 50,000 gal of water for every ton of steel produced, but due to its reclaiming system only 2.8 per cent make-up is required—or 1400 gal of water per ton of steel . . . The 7 cooling tower systems are designed not only to serve a particular plant operation but also to reuse the water in the most efficient manner

ONE OF THE country's most integrated industrial water reuse-recovery systems is built into the Fontana, California, plant of Kaiser Steel Corp.

Most big steel mills report using up to 230,000,000 gal of water a day. In most cases this figure represents water actually used and discarded. Kaiser requires only 2,500,000 gal of make-up water a day, although some 144,000,000 gal are recirculated each day.

While the national average water consumption per ton of steel produced is 65,000 gal, Kaiser uses only 1400 gal of new water. It circulates 50,000 gal for every ton of steel produced, but due to its reclaiming system the company requires only 2.8 per cent make-up—or 1400 gal consumed per ton of steel.

Admittedly the plant is uniquely situated. It is probably the only fully integrated steel plant not located on or even near a large body of water, nor near a river or outfall for disposal of waste water. This situation, determined by ore bodies, raises not only conservation but also waste disposal problems.

There are 5 main factors why the plant has such maximum water reuse efficiency: 1. Management is willing to pay for ultimate conservation; 2. Blow down from each cooling system progresses from best to worst water; 3. Every small conservation method has been maximized, adding up to a sizable total savings; 4. Velocity of cooling system has been increased to the extent that solids do not settle out during cooling cycle; and 5. Coolers are placed in series to reduce water requirements.

A better understanding of the water conservation picture can be seen by consulting drawing above.

There are 7 cooling tower systems. Each system may contain one or several cooling towers, either induced draft, natural draft or forced draft types. Each system is specially designed not only to serve a specific portion of the plant (motor room cooling, mill cooling, tin plate mill

Flocculators like those shown in the upper part of the picture are only a part of the equipment which enables the company to use each gallon of water over and over again. Reservoirs for industrial and domestic water appear in foreground

cooling, etc.) but to reuse this particular water most efficiently.

Water from the company's two, 2000-gpm wells or from a company from which it purchases water, flows into its water treatment plant. Here, water is treated with pebble lime and sodium aluminate, the primary consideration being to reduce solids; softening is secondary. This "new" water flows into 2 reservoirs, the first, industrial, the second, domestic. The domestic water reservoir overflows into the industrial.

Now follows a progressive system of blow-down, from No. 2A motor room cooling system (where the best water is needed) to No. 10 (tin mill process) tower system, where a low grade water is used in tin processing.

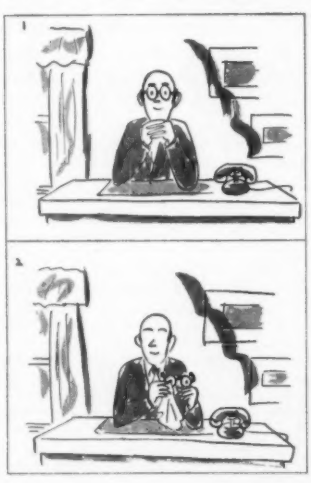
The make-up sequence begins when the industrial reservoir makes up water losses in the No. 2A motor cooling system. The blow-down from this system then becomes part of the make-up for the No. 2B mill roll cooling and scale flushing system.

Since this mill cooling system circulates such large volumes of water and the temperature drop is so great across the cooling towers (as high as 20 F, or 2 per cent evaporation) additional make-up is needed. Purified water from the domestic sewage disposal system supplies part of this additional make-up.

Pickling solutions of water and acid, used in the galvanizing and cold rolling processes, are sent to the acid disposal plant when they become too weak for further plant use. Here the solutions are neutralized, de-sludged, and sent back into the No. 2B system along with the sewage disposal effluent to supply the balance of additional make-up.

Meanwhile, the blow-down from the No. 2B system becomes the make-up for the No. 1 tower system.

Cooling tower systems No. 5 and No. 9 re-cool the water used in washing the gas from blast furnaces No. 1 and No. 2, respectively. Make-up water for these systems and the No. 2 blast furnace cooling system (No. 8 cooling tower) comes as the blow-down from the No. 1 system. A third blast furnace is currently being built at the plant and it will require still another gas washing and furnace cooling system.



The newest cooling tower system is for tin mill processing water. Some of this process water, after being used at the tin mill, about 200 gpm, is pumped to the blast furnaces for quenching slag. Evaporation requires make-up of a like amount which is obtained as the blow-down from the No. 5 and No. 9 systems, thus completing the blow-down and make-up picture.

Water Conservation Sequence

While this is the over-all picture, each tower system has its own water conservation sequence. Cooling system No. 2A is typical. Water from the tower circulates through various motor rooms and reheating furnaces in series—not in parallel. This means that water is progressively heated from a cooler to a hotter process (thus greater heat exchange in cooling) until it is finally returned from a pump sump to the tower for cooling. Thus, cool water is first put to work cooling the various motor rooms, then flows in series through the reheating furnaces (used to heat steel for rolling). Here, water becomes hot and finally flows into sump for return to the tower. This is a closed system except for make-up and blow-down.

An analysis of tower water solids shows how waste water is used and reused from processes requiring the best water to processes requiring less good water—until final evaporation.

A sampling shows that tower system 2B contains water with a total solids count of 460; farther down the line, at tower No. 1, the total solids count is 1019; and at No. 5, 1441. Yet water entered the system with a solid count varying between 34 and 205—depending on whether it was received from a well or from the irrigation company from which the plant buys some of its water. Solid counts also varied from season to season.

Tin Mill Cooling System

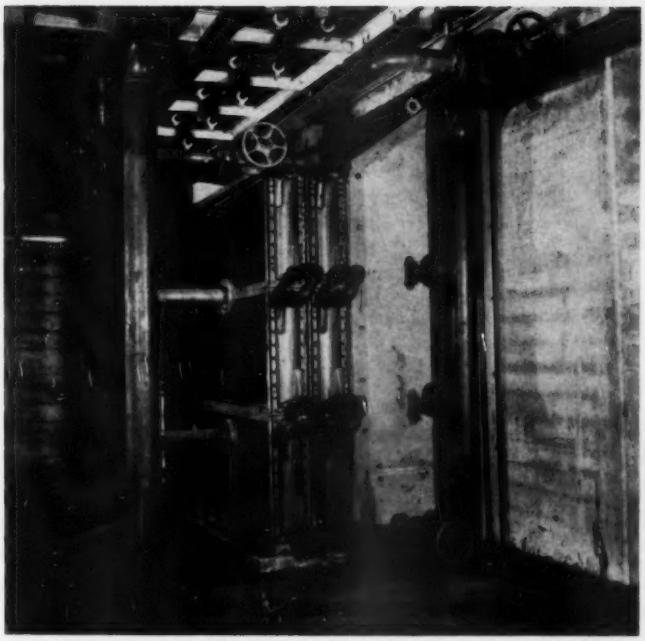
The new tin mill processing water cooling system is typical of the lengths to which plant engineers at the Kaiser plant go to conserve water. This system will receive water from the blast furnace gas washing system and treat it in such a manner as to make suitable water for tin mill use. The system will also treat spent pickle liquor from the tin plate mill and recover water for further use. Designed to handle 600 gpm of process water and to recirculate 7,000 gpm of cooling water, the system will cost $350,000.

This may seem like a lot of money to be spent on conservation. However, at the rate of only 600 gpm make-up, the company could waste water for a good many years before it amounted to $350,000—the cost of this conservation system. The company is mindful of the need to protect their underground water reserves and also realize that they have no place to dispose of large quantities of contaminated water. This is the reason why each system contains sludge beds and clarifiers—reprocessing the closed, circulating water within each tower system.

Water conservation is a fetish at the plant. Coal contains some moisture which is liberated to the gas during coking processes. This moisture is lost in many plants employing similar processes, but at Kaiser the gas passes through a by-products recovery plant, the moisture is condensed out, recovered, and while unsuitable for ordinary industrial cooling without treatment, is used to quench coke. Even this quenching water is reused.

In most cases a number of coolers are placed in series, reducing the water requirements. Series flow reduces water consumption, means lower cooler losses and greater heat differential across the system for most efficient operation. Also higher velocity permits higher concentration of solids with less loss of cooler capacities due to solids build-up.

Series flow means much greater efficiency. Typically, the original installation of fans and turbine drives was equipped with water cooled bearings and oil coolers. Each bearing or cooler had its individual supply of water—7 to 10 different hook ups (inflow-outflow). It was necessary to throttle the inlet valves to nearly closed position to get a reasonable temperature rise.



Air cooler in one of the motor rooms. Cooling water now flows in series through coolers, instead of parallel. Series connections reduce the water consumption

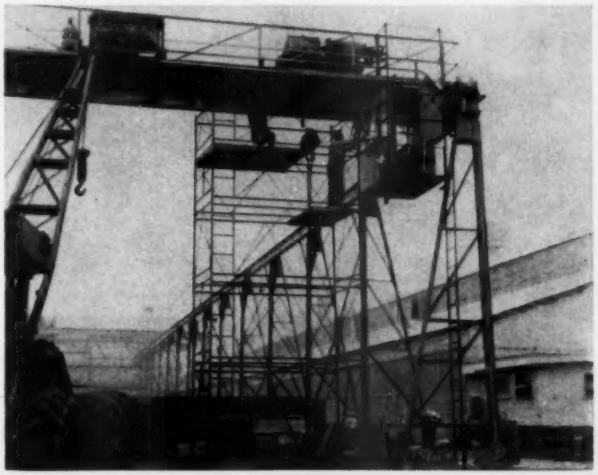
Now, a single line replaces the 7 original cooling lines. This one line is connected in series, progressing from the coolest parts of the fans and turbine drives to the hottest—from main pedestal bearings through gear reducers, oil coolers and finally to the turbine's bearings. Series hook-up resulted in a 60 per cent reduction in the amount of cooling water used. A multiplication of similar savings throughout the plant accounts for the extremely low water make-up requirements—just 2.8 per cent of total gallonage used.

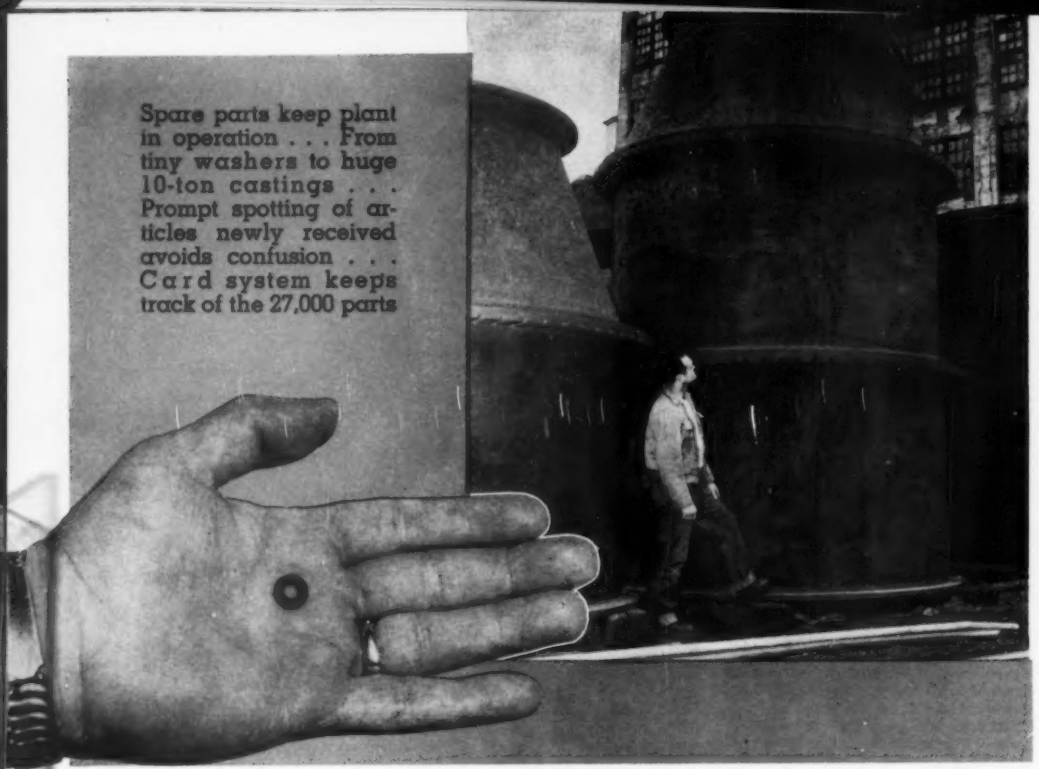
Scaffold Makes Maintenance Safe

DOING MAINTENANCE and repair jobs on equipment high above the ground is often very dangerous work. But not at the Torrance, Calif., plant of The National Supply Co., where the Maintenance Department designed and built this sectional steel scaffold to lessen the risk.

Made of tubular steel, it can be taken apart and moved to other locations as needed. It permits a high job to be performed quickly and safely. Platforms may be placed at the levels desired. A steel ladder and adequate railings add to workers' safety.

The picture was taken as the cab of the weld shop crane was being moved from the center to the side. Although the job had to be done as quickly as possible with a number of electricians and others working in a small, high area at the same time, it was completed without any mishap.




Spare parts keep plant in operation . . . From tiny washers to huge 10-ton castings . . . Prompt spotting of articles newly received avoids confusion . . . Card system keeps track of the 27,000 parts

Staley's Maintenance and Tool Stores Keep Order to Fill Orders

These visible files speed up the location of the many diverse articles in storage

WHEN A TOOL or replacement part is needed in the plant of A. E. Staley Manufacturing Co. in Decatur, Ill., 99 times out of 100 it is on hand in the company's store room—from a drill as small as a needle to a 10 ton casting.

In the files of inventory control are stock numbers for approximately 27,000 items which are always on hand. These include not only a vast variety of articles, but an almost endless assortment of many of them.

Having all these parts on hand is just a fraction of the solution of plant maintenance problems. Quite as necessary is a complete record of what is needed, where it is needed, and where it is stored. With inventory control and close cooperation within the stores department, this part of the problem is also solved.

As the plant grew in complexity, the number of stores items increased accordingly and space allotted to stores was becoming inadequate. That condition was remedied when the mechanical shops building was

The idea of designating one particular section of shelving for regular storage of some of the traps permits attendant to quickly spot the requested article

constructed. In its planning a large area for stores was included.

At the time the store room moved into its new quarters, the inventory control system was worked out. Months of preliminary groundwork preceded the big move. Sorting, identifying and marking each item followed. This was no small task in itself. Now each of the 27,000 items is catalogued in the index files, and has its own card in the files. A permanent place is assigned to the item in the store room where it can be easily found.

After a bin, rack, or drawer is assigned to an item, that location is noted on all future orders for the article and replacements are easily stored. Under the heading of Storage Locations, information such as building number, building section, row, rack or bin, shelf or drawer are noted on a card.

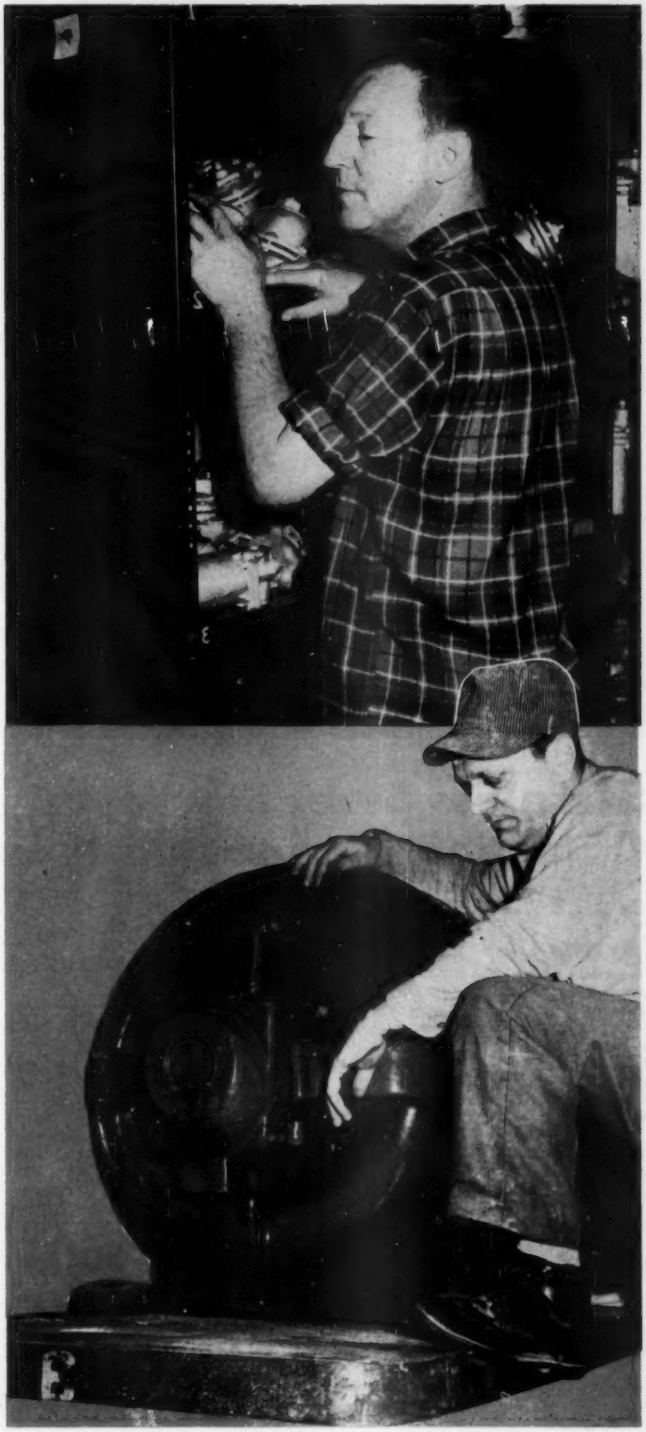
Through this card system, inventory control lives up to its name. Not only is the location of each item noted, but also the quantity on hand, date each item is issued to a mechanic, quantity ordered and date ordered, expected delivery date, actual date, and the use period of the item. In the store room the same precision is observed. As soon as an article is received it is placed in its proper place.

Each tool or part taken out by a mechanic is charged to him until it is returned. Records are also kept here of all replacements issued, and departments to which they are sent.

Doorways have been made large enough so that trucks can drive in with heavy deliveries or pick up heavy replacements. For lifting and carrying other large machines and parts, from the store room to an adjacent shop the overhead monorail is generally used. In every case items are handled as few times as possible.

The fact that the store room is adjacent to the mechanical shop is a big factor in the successful operation of this system. The tool room is centrally located for all trades. Lumber is stored in a room which adjoins the millwright shop. Metals, shafts and such items are stored so that they are on a direct monorail route to the sheetmetal and boiler shops in the adjoining part of the building.

As one of the foremen said, "It's something to know that you never have to worry about there being an adequate supply of materials you need for a job. You know that when your stores reach the determined minimum, another supply is ordered."



Here is shown one of 6,300 electric motors that are kept in the plant store room. Heavy motors weighing up to 4,000 lb each are stored in orderly rows

Perforations in the stationary vibration conveyor allow excess oil and salt to drain into waste disposal units which help keep the conveyors clean

Before—the vegetable oil caused trouble . . . Created a weekly cleaning problem . . . Now — stainless steel conveyor eliminates maintenance and replacement costs, ups the output

Stainless Steel Conveyor Cuts Maintenance Costs in Half

By **DALE WILLHITE**, Plant Manager, The Frito Co.

PLANT MAINTENANCE is more exacting and thorough in a food processing plant. For, aside from machinery repair and general upkeep, sanitation is a constant work-a-day chore. That is why the Frito Co. in Los Angeles designed their new $500,000 plant 2 years ago with sanitation written into the specifications.

One of the perplexing maintenance-production headaches experienced in the old plant with almost migraine recurrence, was how to keep a 60-ft conveyor (which is the heart-core of production) in maximum sanitary condition. The prime product of the company, Fritos, is a corn-chip food. It is fried in a 1000 gal, constantly-circulating, vegetable-oil vat, and then conveyed to the packaging line after first passing under salt hoppers.

In the early stages of maintenance-streamlining production, the company concluded that the conveyor belting formerly used would not be satisfactory, because: (1) vegetable oil softened conveyor belting, and (2) canvas webbing became oil-impregnated, was difficult to keep clean, and had to be removed at least once a week for cleaning.

Canvas belting was boiled, scrubbed, then hung up to dry. In the process—because the main food conveyors and auxiliaries involved half a dozen belts—the belt cleaning required a goodly portion of the 20-man production-maintenance crew. The maintenance bill mounted and so did conveyor webbing replacement costs. A typical canvas belt was discarded after 6 months. And during that period had probably been washed 24 to 30 times.

But when the new plant was designed it was decided that only a stainless steel vibrating conveyor would both cut maintenance cost and maintain our product at maximum sanitation.

Today, the two-level, 10-in wide, 60-ft long double-decked stainless steel conveyor has halved maintenance time and up-keep cost. But more than that, the stationary conveyor's vibrating action has in itself become an important step in production. Vibrating the product from vegetable-oil vats to the packaging line aerates the product, prevents it from sticking together and cools it during its 60-ft travel.

Where before the only effective method for belt cleaning was to remove one canvas webbing and substitute another, now a single production maintenance crewman is assigned to the conveyor and adjacent production machines. At frequent intervals during the production day the line is shut down for a matter of perhaps 2 or 3 minutes and he thoroughly wipes down the stainless steel conveyor with a dry cloth.

Maintenance-wise, another advantage in the vibrating conveyor, which incidentally is 16-gauge stainless steel, is that there are no

moving parts such as pulleys and belts. The only machines involved are the vibrators and their ⅓ hp 220 v motors, spaced at 30-ft intervals. The vibrating units are checked but once a month; their oil changed about every 3 months.

With the use of canvas conveyors, it was found that frequent washings reduced the life span of the belting to about 6 months. Almost invariably the canvas shrunk. This meant that an expansion piece had to be laced into its length until it again stretched into shape. These expansion pieces were the weakest points in the belts and gave a lot of trouble.

More important, from the maintenance aspect, were the hours spent by the production-maintenance crewmen in removing belts, washing them, and repositioning clean belts on the machine. It used to require 2 men during the Saturday shut-down to remove and replace all canvas belting.

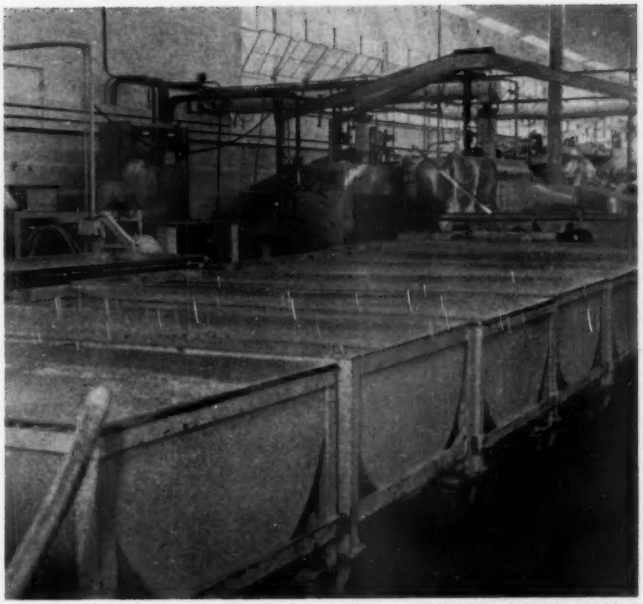
Today, probably no more than an hour or two a week is required to keep the stainless steel conveyors in tip-top sanitation. A further cut in the maintenance bill is possible by assigning some clean-up jobs to machine operators. By midnight Friday (after maintaining a 24-hour work day since the preceding Sunday), the night shift's production crew begins dismantling the machines, preparatory to cleaning. Saturday is general clean-up day, although clean-up follows each work shift.

Quarry-tile floors and tiling along all production-department walls, to a height of about 5 ft, allow thorough hosing-down between shifts and during the weekly clean-up. Floors are washed with mild caustic soda, scrubbed with detergent and finally cleaned with medium-pressured steam.

But most important from the maintenance standpoint is the ease with which maximum sanitation is maintained with the stainless steel conveyors. Even on weekly clean-up its a simple job for one or two crewmen, working along a cat-walk paralleling the conveyors, to wipe them thoroughly.

Another maintenance problem, associated with the product, was the accumulation of salt, mixed with vegetable oil, which complicated the conveyor sanitation problem. Objectionable salt concentrations were eliminated by perforating the conveyor a few feet before and after the salt hoppers. Excess salt and oil drain through these perforations to waste disposal units beneath.

Cost-wise, instead of replacing belting every 5 to 6 months, the stainless steel conveyors have been in constant use now for over 2 years without replacement. Because the product is abrasive, it also acts as a cleaner as it progresses up the conveyor to a point above the packaging section.



Corn is kept in these stainless steel vats—before it is made into the finished product. Note that the vats are built on casters which are guided by tracks. Quarry-tile floors and tiling along all production-department walls, to height of 5 ft, allow thorough hosing-down between shifts and during weekly clean-up

Circular receptacles receive the finished product as it comes off the conveyor which can be seen in the background. Filled boxes are sealed and placed in carton

Two Plant Engineering Societies Formed in Greater Pittsburgh Area

Present at the inaugural meeting of the Pittsburgh Plant Engineers Society, standing, left to right: C. A. Wedge, Mine Safety Appliances Co.; Robert Foster, Allegheny Ludlum Steel Corp.; Harold N. Leach, Pittsburgh Forgings Co.; R. P. Crane, Federated Metals Div., American Smelting and Refining Co.; Thomas E. Hanson, Plant Engineering magazine; and Rocky Marinello, Plant Engineering magazine. Seated, left to right: O. M. Tishlarich, A. M. Byers Co.; L. N. Crow, Geo. E. Drake Baking Co.; Robert T. McLean, Oswald and Hess Co.; Francis A. Yost, Fried and Reineman Packing Co.; and Harold R. Logiodice, Liberty Baking Co. Next meeting of group will be held last week in October

ON SEPTEMBER 22nd, a group of plant engineers from the Pittsburgh area met at the Hotel William Penn to discuss the formation of a plant engineers society in that area. The main purpose of the society is to afford an opportunity for study of plant engineering problems by papers, discussion of personal experiences, and talks by members or invited guests.

There were nine men present at this inaugural meeting. After an informal meeting, preceded by refreshments and dinner, the group appointed Francis A. Yost, Fried and Reineman Packing Co., temporary chairman. C. A. Wedge, Mine Safety Appliances Co., was appointed temporary secretary-treasurer.

Francis A. Yost appointed a temporary committee to investigate constitutions and by-laws of other plant engineers clubs and propose a constitution and set of by-laws for the Pittsburgh group. The men appointed to this constitution committee are: Harold Logiodice, Liberty Baking Co.; Robert McLean, Oswald and Hess Co.; and Harold Leach, Pittsburgh Forgings Co.

The second meeting of the group will be held the latter part of October when they will discuss the draft of a constitution and set of by-laws proposed by the committee and plan a schedule of events for the coming meetings.

Neville Island

The following evening, September 23rd, a group of plant engineers, whose companies are located on Neville Island, Pittsburgh, met at the Greater Pittsburgh Airport to discuss the formation of a plant engineers association to cover the Neville Island area.

After refreshments and dinner, the group set down tentative plans for the organization's structure. They appointed Robert W. Hiller, Dravo Corp., temporary chairman. He, in turn, appointed a temporary committee to check into the various constitutions and by-laws of the other plant engineers clubs and present their proposed constitution and by-laws at the next meeting.

The men appointed to the temporary committee are: John Lytle, Vulcan Detinning Co.; H. T. McBride, Pittsburgh Coke and Chemical Co.; and L. J. Sitomer, Neville Company.

The Neville Island Association favored the suggestion made by Harold Leach and Robert McLean, members of the Pittsburgh meeting held the night before, that the two groups organize under one constitution and set of by-laws, and possibly have joint meetings several times a year. This will be discussed by the two committees and their findings will be presented at the next meeting of each group.

Who's Next?

East, West, North and South Plant Engineers Clubs are springing up. The question is: "Who will be next?" The answer: The next group of plant engineers interested in having a local society. Just write in and **PLANT ENGINEERING** will help get the group started, at no obligation to you.—Editors

Officers and Meeting Dates of P. E. Clubs

BALTIMORE

(1st Tuesday of month) †

A. D. Field (President)
Bethlehem-Sparrows Shipyard, Inc.
Sparrows Point, Maryland

J. W. Lautenberger (Vice President)
Davison Chemical Co.
Baltimore, Maryland

J. F. Wolfe, Jr., (Secy-Treas.)
Black & Decker Mfg. Co.
Towson, Maryland

BOSTON

(3rd Thursday of month) †

Edward W. Benner (President)
American Sugar Refining Co.
Boston, Massachusetts

John J. C. Coffin, (Vice-President)
Towle Manufacturing Co.
Newburyport, Massachusetts

Byron A. Engelbach (Secy-Treas.)
New England Confectionery Co.
Cambridge, Massachusetts

CALUMET

(3rd Tuesday of month) †

E. F. Hanford (President)
Lever Brothers
Hammond, Indiana

Maurice O'Hern (Vice-President)
American Steel Foundries
Hammond, Indiana

Otto Seidl (Secy-Treas.)
Combustion Engineering-
Superheater, Inc.
East Chicago, Indiana

CHICAGO

(1st Tuesday of month) †

Don Brown (President)
Corn Products Refining Co.
Argo, Illinois

C. E. Burns (Vice-President)
A. B. Dick Co.
Niles, Illinois

T. S. Ramond (Secy-Treas.)
Goodman Mfg. Co.
Chicago, Illinois

DAYTON

(4th Thursday of month) †

Charles W. Wright (President)
Delco Products, Div. of GMC
Dayton, Ohio

Vernon Kahl (Vice-President)
Moraine Products, Div. of GMC
Dayton, Ohio

M. B. Proctor (Secy-Treas.)
The Leland Electric Co.
Dayton, Ohio

NEW YORK

(3rd Tuesday of month) †

Lester B. Woolfenden (President)
General Aniline & Film Corp.
Grasselli, New Jersey

Harold Travis (Secy-Treas.)
Jacob Ruppert Brewery
New York 28, N. Y.

PHILADELPHIA

(1st Tuesday of month) †

R. F. McCaw (President)
Radio Corp. of America
Camden, New Jersey

S. E. Stiner (Vice-President)
Rohm & Haas Company
Bristol, Pennsylvania

James MacDonald (Secy-Treas.)
General Electric Co.
Philadelphia 42, Penna.

SAN FRANCISCO

(2nd Thursday of month) †

Fred M. Reibin (President)
General Metals Corp.
San Francisco 10, Calif.

Carl Olmsted (Vice-President)
Westvaco Chemical Div.
Newark, Calif.

Andy Caridis (Secy-Treas.)
Heat and Control Inc.
San Francisco 3, Calif.

† Meeting Dates

Present at the inaugural meeting of the Neville Island Plant Engineers Association, standing, left to right: Robert T. McLean, Oswald and Hess Co.; L. J. Sitomer, Neville Company; Harold N. Leach, Pittsburgh Forgings Co.; R. S. Henderson, The Cementstone Corp.; and Rocky Marinello, Plant Engineering magazine. Seated, left to right: H. T. McBride, Pittsburgh Coke and Chemical Co.; Robert W. Hiller, Dravo Corp.; Thomas E. Hanson, Plant Engineering magazine, John Lytle, Vulcan Detinning Co.; and F. C. Williams, Dravo Corp. Group favored idea the two clubs organize under one constitution

Dictaphone's Parking Lot and Plant Engineering's Article

By M. R. BLISH, Plant Engineer, Dictaphone Corp., Bridgeport, Conn.

It was a tough job to remove template from driven rods. Problem was solved as shown here. One rod was driven to hold template in place; then lime was poured through holes around edge of template to locate all of the other rods

IN THE JULY, 1951, issue of PLANT ENGINEERING there was an article with the title, "Parking Lot Layout Is Planned to Handle Large Volume of Cars," by V. McCabe, Plant Engineer.

We, too, had a parking lot problem and after considering several suggestions involving 90 degree and 60 degree angle parking we decided to use the 45 degree angle scheme outlined by Mr. McCabe. We made a template, purchased the concrete chocks made to specification and the steel pins and during the month of July we installed the chocks using the herringbone pattern.

We followed Mr. McCabe's outline and suggestions closely, but with a few exceptions. These exceptions and our experience may be of interest to others who are contemplating laying out this type of a parking lot.

In the first place instead of a minimum width of 18 ft between rows we found by actual trial before installing the chocks that a 10 ft width was sufficient. Now that the installation has been made and tried out this width proves to be very satisfactory. The advantage, of course, is the ability to park more cars.

On the left: steel rod with adaptor made by Mr. Blish's department. The steel rod goes into the adaptor 3½ in. and when the bottom end of the adaptor touches the ground the rod is the required distance into the ground. On the right: Sawed-off drill point that is inserted into the top of the adaptor

When we asked for quotations on the concrete chocks reinforced by 1¼ in. rods as per Mr. McCabe's specifications, we were told that the size of the rods was heavy in relation to the size of the chock and that by substituting ½ in. reinforcing bars we could reduce the price by 35 per cent. We made this change and so far have experienced no trouble.

We started in to drive the pins by hand, but found this to be a back breaking job, and by the use of a portable air-compressor which we were able to rent and an air-hammer the time of driving the pins was cut approximately in half.

In order to hold the pins while being driven we made an adaptor out of a piece of 2½ in. cold roll shafting about 8 in. long. In one end we drilled a hole which would receive the end of the pin and in the other end a hole which would receive a hammer point which had been cut off to a length of about 4 in. from the end of the hammer.

In attempting to drive the pins through the holes in the template, however, we encountered considerable difficulty because the pins would hit stones and slant off at an angle. This situation made it difficult, of course, to lift the template off the pins and after a short trial we decided on a slightly different method of operation.

After driving one pin and laying the template straight by means of a cord we dropped a small pinch of lime into each hole and after lifting the template from the ground the location of the holes was clearly marked.

We made one mistake in the use of reinforcing bars from which to make the pins. The projections on the side made it difficult to lift the template off the pins, even when only one pin had been driven. It is better to use a pin made from a smooth rod.

In general we have nothing but favorable comments on the layout and the ease with which the drivers can get in and out of the parking lot. In order to make the maximum use of the space in the lot we assigned a letter to each row and designated the row in which the car owner was to park by printing this same letter on the parking sticker.

Air Circuits Double Operator Output

WITH A COMPRESSED air line in a plant, the versatile engineer has a power source he can easily adapt to particular production needs. Air is abundant, relatively inexpensive, flexible and easily transmitted.

The "homemade" air devices assembled on the plant floor are having a pronounced effect on production volume. One such device, at Barth Stamping and Machine Co., Cleveland, is now becoming quite generally accepted.

Motive behind the device was to double the production of the drill press operators of a close tolerance reaming operation.

A special fixture, with a spring-loaded ejector rod, had been designed by Barth for the job. But the reaming of the two holes involved quite a bit of manual work and one operator to each machine. The piece was loaded into the fixture and held by hand, while the operator manually fed and withdrew the reamer. Part ejection from the fixture was accomplished by tapping the ejector knob.

A study of the operations revealed three motions which could be done quickly and reliably with air: holding the workpiece in the fixture, feeding the reamer and withdrawing the reamer.

Further study showed that the air circuits for two machines could be easily linked to the main air line and that one operator, seated between the machines, could operate both with minimum effort.

This meant one operator on two machines and, at minimum, a 100 per cent production increase per operator.

The operator places the workpiece

(Continued on page 186)

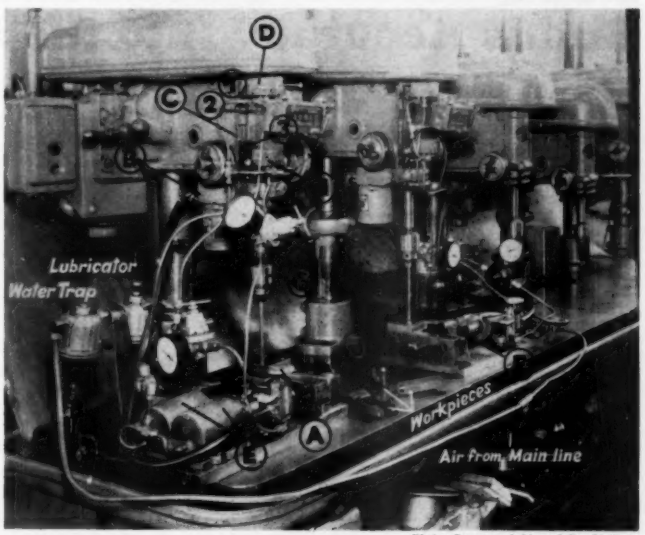


Photo: Compressed Air and Gas Institute

Fig. 1. Two drill presses equipped with air circuits for automatic reaming. Principal components identified as: air valve for starting, A; spindle cylinder, B; travel control rack, C; clamp valve, D; clamp cylinders, E; clamp heads, F; spindle, G; cycle reversing valve, H; ejector rods, J; control cams, 1, 2, and 3

New Anaheim plant of Northrop Aircraft is of reinforced concrete with 50 ft clear-span bays, purlin centers of 25 ft

DUST-PROOF PRODUCTION LINE Builds Accuracy Into the Product

IN MAY OF this year PLANT ENGINEERING was invited in to see final assembly of a secret fire-control instrument for the armed forces—being produced in Northrop Aircraft, Inc.'s new, 250,000 sq ft facility near Anaheim, Calif.

Since the plant is the newest of its kind (opened Nov. 1, 1951, and not yet fully tooled up), the Army and Northrop wanted PLANT ENGINEERING to pass on to engineers everywhere the technique of product assembly in a dust-proof, temperature-controlled area, with emphasis on the part played by the plant engineer. Final assembly of the instrument (of precision optical design) is done in a 30,000 sq ft room—heart of the plant. The plant is under direction of the U. S. Ordnance Corps.

The success of final assembly depends upon maintenance of three control factors: a room temperature held within 2 degrees F (72 to 74 F); a relative humidity controlled within 40 to 45 per cent with 42 being the average relative humidity; no more than one-tenth of a million particles of dust per cubic foot, with the maximum particle size about 2 microns.

Specially engineered air-conditioning, venting and heating control the assembly room to these minimums and maximums, but the big, important and delicate balance depends upon: the number of employees in the room; floor conditions; kind of clothing worn by employees; activity on the assembly line; type of daily room maintenance (care of floors, etc.); strict compliance with rules by employees.

The assembly room: Basically, the assembly area is rectangular, 30,000 sq ft area, 100 by 300 ft, with double-dry 6-in. thick, pre-cast concrete walls and a suspended, insulated ceiling. The hung ceiling, especially designed to prevent dust from seeping into the room, has an acoustical covering tied to the beams. Atop the beams is a layer of aluminum foil, and the dead-air space between this layer and the acoustical material is filled in with wool batting—idea being to catch stray dust particles.

There are four entrances to the assembly area and one emergency exit. All four entrances are rigged with double-doored dust locks, and have dust traps (really, a lint-free rug) near the door adjacent to the remainder of the plant. Employees are required to leave their coats on special racks within the air locks, and change into lint-proof smocks before entering the dust-proof room. Smoking is strictly forbidden.

Air is changed 4.5 times an hour and all make-up air is heavily filtered, then run through the scrubbing and air-conditioning systems. The room itself is maintained at a slightly higher pressure than the rest of the plant, so that the tendency is for air and its dust particles to seek escape into the non-controlled areas of the plant, rather than to suck in dust from these areas.

Air-conditioning system: Air from the room is returned to the air-cleaning system via 60 by 36-in. ducts, located near the floor on one side of the assembly area. (This ducting varies from 60 by 18-in. to

Final assembly room as it looked prior to bench set-ups. This is "heart" of plant

Parts not being worked on are kept under plastic covers in partitioned plastic boxes

Whenever the fire-control instrument made in the plant is off its special racks it is handled with this 1-ton hydraulic hoist

60 by 36-in.). Four intake filters are built-into the ducting, and are equipped with oil-impregnated filters (removable and cleanable).

Room air and incoming (filtered) make-up air from outside enter the air-conditioning unit and go through these steps: 1—is passed through Farr filters; 2—next, air passes through an electrostatic precipitator, where dust particles are entrapped; 3—then, through two banks of scrubbers which clean and saturate air above the desired humidity; 4—air passes through and over cooling coils, where excess moisture is condensed leaving just enough to meet humidity control standards; 5—passes through another filter unit, then over steam heated coils where air is warmed to control temperature.

Air is exited from the system through a blower (powered by a 10 hp motor) and is carried back into room via a system of above-the-ceiling ducting (with a special damper arrangement to give the room a slightly higher pressure). Return air is evenly distributed via air diffusers, 480 cfm each, and so distributed that there is no appreciable draft.

Despite this modern and up-to-date humidity and temperature control system, the minimum tolerances (temperature, plus or minus 2 degrees; humidity plus or minus 3 per cent) should not be maintained were it not for strict supervision of activity within the assembly area.

Rules and Procedure: Plant Engineer James M. Ricketts says that study to date has shown that at least two full-time maintenance men should be on duty at all times within the controlled area to see that rules are not violated. Introduction into the room of a non-lint-free rag could send the particle count up—almost immediately.

Asphalt tile floor covering, rather than concrete, was used because of concrete's tendency to powder with wearage. Dust conditions are proportional, under normal operational procedures, to the number of employees at work in the controlled area. About 150 will work in the area when assembly is in full swing. Women employees are asked to wear face powder sparingly, or better, not at all.

No soap or detergents may be used in washing the floors, and a special mopping technique has been adopted: mopping equipment is left in the dust locks, the mop is soaked in clean water, wrung out almost dry, and applied evenly and with as little motion as possible to a small section of the floor (about 150 sq ft at one time). Immediately upon drying (about 15-20 min), the area is buffed, laying on a very thin coating of Carnauba-based wax. Too much wax increases the particle count.

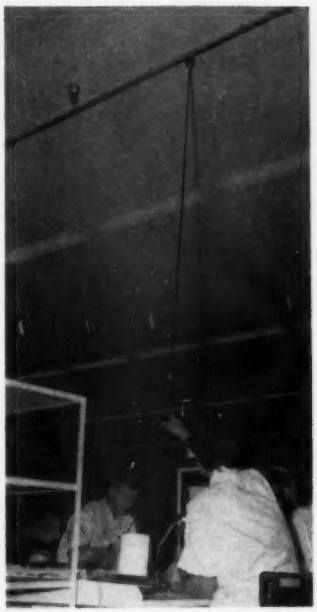
All room maintenance equipment (dust-free, lint-proofed rags, etc.) are "special" for the control area and are not carried nor used outside it; smocks must not be too highly starched, as this powders, upping the dust count. Microscopic examination of air samples reveals that persons with excessive dandruff should be either excluded from the control area, or wear lint-free cloth hats; all delicate parts must be cov-

Dust-proof smocks, plastic covers all help cut down on lint and dust count

ered with plastic dust protectors (dust covers) when moving from one assembly point to another.

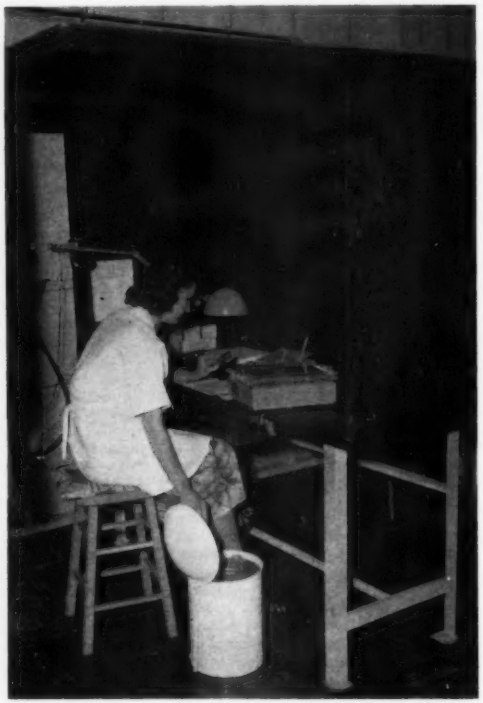
Northrup's dust-free room is also equipped with special dust excluding devices. All small parts are removed immediately upon receipt (from their shipping boxes) and are placed in wooden-compartmented trays and these slipped into clear plastic "bread baskets" with plastic tops. When an assembler needs a part, he takes one from the plastic box, immediately replaces the cover. Most work benches are rigged with either high or low vacuum for sucking up dust particles and shavings. In addition, some special metal-working equipment is installed with portable vacuum cleaners (admittedly not as efficient as an expensive vacuum system, but less expensive).

Plant Engineer Ricketts has also found that paper bags and towels contribute to the dust count, so only dust-free, special photographic lens cleaning paper is used within the control area. Daily, and sometimes more frequently, particle counts are taken with a dust counter. The temperature humidity control is fully-automatic, with modulated-type control, anticipating changes and adjusting the temperature (cooling and heating) coils in the air conditioning system.



Air conditioned assembly room is made flexible by overhead conduit and outlets

All instruments being made are kept under plastic covers for safety against dust during the final assembly operations



Special control booths further guard against lint and dust. Note vacuum hose which sucks up dust from components

On the right a worn wheel ready for turning. In the center, wheel turned with ring partially in place. On the left the renewed wheel with hardened flange. Flange rings are made from scrap 6 in. heavy tubing, available in plant

Re-Working Monorail Wheels Saves Convair $13,000 Yearly

By F. C. CLAYTON, Plant Engineer, Convair, Ft. Worth Division

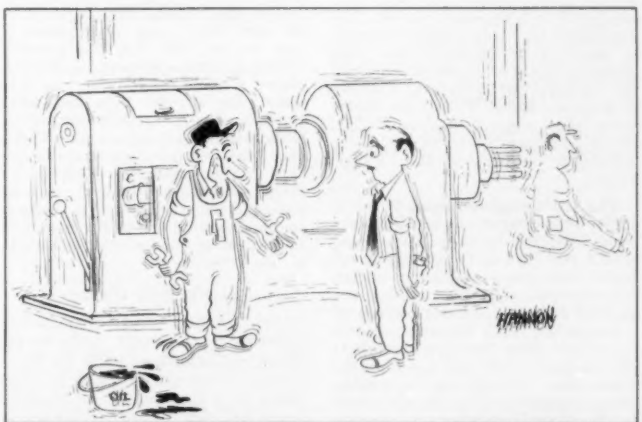
CONSOLIDATED VULTEE Aircraft Corporation as lessee and operator of Government Aircraft Plant No. 4, Fort Worth, Texas, has among its other responsibilities that of maintaining some twenty miles of monorail runways together with the numerous crane bridges and hoists operating thereon. The two major items of maintenance are the wheels and tracks which are a special rolled I-beam section.

Cost $20 Each

Wheels as originally furnished are relatively soft steel forgings with a replacement cost of approximately $20 each. Monorail beams are of hot rolled steel and are furnished in 25 ft sections. In operation, the wheel flanges in taking up side thrust wear against the edge of the beam rail and after a period of time gall quite badly with the dual effect of turning the bottom edge of the beam downward forming a sharp, ragged edge and at the same time depositing particles of metal on the rolling surface of the beam which wears both beam and wheel tread. The sharp bottom edges of the beam tend to cut and ruin the pneumatic tires used to drive the cranes. Wheels, when worn sufficiently must be replaced.

In order to salvage the worn wheels and cut down the cost of replacement of both wheels and rails, a member of the Convair Plant Engineering Department submitted an employee suggestion which not only accomplishes its objective but shows promise of savings in excess of $13,000 per year. The method of salvage of the wheels is to turn the flanges of the worn wheels to thin them, then shrink on a case-hardened steel ring to replace the metal worn and turned off.

This creates a new flange of hardened metal and experience to date indicates that this will not gall on the rails thereby eliminating a major portion of the wear and doubling the life of the rails. Approximately 40 per cent of the wheels require grinding of the tread as well as replacement of the flange and the cost of repair varies from approximately $1.60 to $3.40 each, with an average cost of $2.32. This is in contrast with $20 each for new wheels without hardened flanges. The major savings, however, will result from reduced rail wear as the man hours required for changing out rail sections are quite high and this work must always be accomplished at a premium to avoid interruption of plant operations.



"YOU AIN'T GOING TO LET A LITTLE CHATTER BOTHER YOU?"

Suggestion plans really work in the Buffalo area industrial plants because of wholehearted cooperation between labor and management . . . The plant engineering department takes an active part in the plan

Cooperation Is Key to Success in Buffalo Suggestion Plans

By E. WELLER, Buffalo Correspondent

SUGGESTION SYSTEMS are no longer new. All major plants have set up some routine. The Buffalo-Rochester-Niagara Falls area in the heart of America's great industrial centers, is seeing many of these suggestion systems working out successfully in plants whose products are known throughout the world.

Three leading plants in this area are The Carborundum Company, Niagara Falls, N. Y.; Remington Rand, Buffalo and Tonawanda, and Westinghouse Electric Corporation, Buffalo.

Features in Common

Certain basic features are common to all these suggestion plans. Suggestions are presented on some form of numbered blank which is readily available to employees. When a suggestion is received it is filed, investigated and then either accepted or declined. If the latter, the Suggester is given an explanation as to its refusal; if accepted, suitable awards are made. This is the skeleton of most suggestion plans. Details of each company's system may differ according to individual requirements.

The Carborundum plan started in 1942. At that time a Labor-Management War Production Drive Committee was formed to promote bond, Red Cross, scrap and other drives. Management members were appointed from the different levels of management and Labor members were elected by their own membership, with four of each group on the committee. It was later suggested that a Suggestion Plan be sponsored by the same Committee. It has continued to function as a joint operation, but in 1945 the name was changed to Labor-Management Production Committee. The president of the Union is an honorary member.

Most responsible for the success of this system are R. B. Luce, Chairman and Administrator, and R. G. Albertson, Bonded Products and Grain Division Works Manager; Henry W. Power, Manager of the chemical laboratory; William Stube, Assistant Works Engineer in charge of maintenance; Dominic DeLuca, grain department, and secretary of the employees' group; Leo Groupil, shipping department, box shop and finished stock; Ray Bowser, wheel making and finishing, and Michael Plumer, maintenance department, all members of the Labor-Management Committee.

A Labor member acts as a temporary chairman for each Suggestion Committee meeting, conducting that part of the meeting that pertains to his own plant area. Each takes a turn in this and the Management chairman acts as observer and moderator. This "Role Playing," as it is called, has proved very beneficial and has notably increased employee participation in suggestions. There have been several cases where members of this committee have taken extra-curricular training in speech and conference leadership, a definite personal advantage to the member as well as to the general efficiency of his department.

Blanks Near Clocks

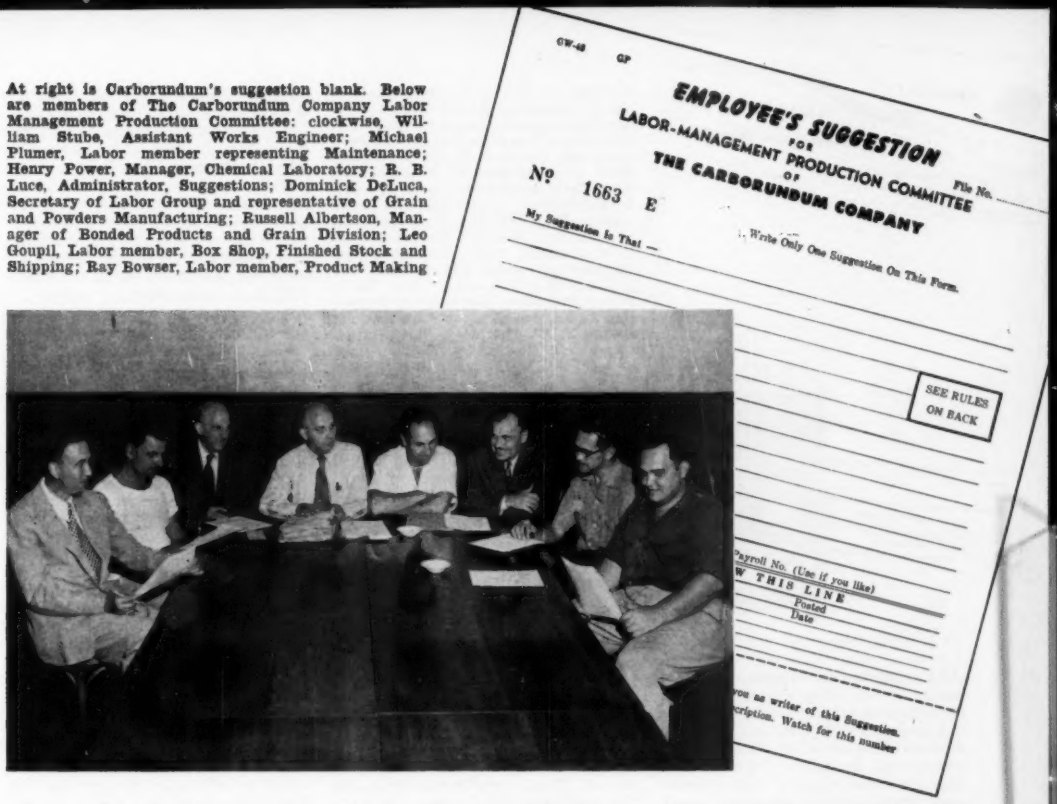
Carborundum uses distinctively colored, consecutively numbered blanks with matching stubs for Suggesters. These are provided in open boxes near time clocks, in departments and locker rooms. After being filled in the blanks are deposited in locked boxes set up at various places in the plants and at main entrances. The Suggester retains the stub as an identification for his suggestion. These blanks are collected daily, stamped as to date received and acknowledged by the Suggestion Committee and the Committee's decisions are later posted on bulletin boards. The stamped dates are important as that of the receipt of the suggestion may be necessary to establish priority over a similar idea submitted by another employee, while the date of acknowledgment may serve as a reference to a specific bulletin. Suggestions are carefully reviewed for possible duplication, edited for clarity and transcribed on suggestion investigation request forms and records.

Three Files Used

There are three record files maintained on a yearly basis—numerical, contents of suggestions and a declined file. Declined suggestions are subject to appeal over a period of three years, if not then accepted, are discarded. It is sometimes necessary to delay a decision on a suggestion until quite extensive research is done on the new idea. If, after thorough investigation, the suggestion is accepted suitable awards are made to the Suggester.

Suggestions are sorted into four groups representing the plant areas of the four Labor members of the Labor-Management Production Committee. Before the general meeting each group is reviewed by one of four separate sub-committees composed of the chairman of the Labor-Management Committee and one Labor member. Suggestions are then screened and sorted into categories—safety, those requiring trial, those accepted, declined, etc. These

At right is Carborundum's suggestion blank. Below are members of The Carborundum Company Labor Management Production Committee: clockwise, William Stube, Assistant Works Engineer; Michael Plumer, Labor member representing Maintenance; Henry Power, Manager, Chemical Laboratory; R. B. Luce, Administrator, Suggestions; Dominick DeLuca, Secretary of Labor Group and representative of Grain and Powders Manufacturing; Russell Albertson, Manager of Bonded Products and Grain Division; Leo Goupil, Labor member, Box Shop, Finished Stock and Shipping; Ray Bowser, Labor member, Product Making



are then presented to the main committee in package form, separated according to category. Suggestions requiring investigation are presented for review on explanatory forms. A short form is filed in the contents file. The investigation reports are later filed with the original suggestion.

Awards for accepted ideas are made according to four fixed standards—minor, medium, major savings and those which mean improvement of saleable products. All suggestions are subject to a further review and an added award given, based on 10 per cent of one year's tangible gross savings of $250 or more per year after a suggestion has been in accepted use for that period of time.

Much importance is placed on the help Suggesters may be given by foremen of the various departments. They are urged to explain the suggestion system to employees of their departments and to ask them to submit suggestions. Meetings are held with foremen and it has been found that more interest is created in a department when a wide-awake foreman keeps in close touch with his employees for suggestions.

The Remington Rand Suggestion Plan began over six years ago. It is the responsibility of the Operations Policy Committee for its general policies. The chairman of the Manufacturing Committee acts as co-ordinator of the Employe Suggestion Plan. The Committee meets at his call when matters of policy need consideration. The Administrator is responsible for the over-all cooperation and administration of the plan and provides regular reports on operations and comparisons of performances to the chairmen of the Manufacturing Committee for distribution to company officers. He keeps all divisions informed as to accepted suggestions.

The Administrator's Job

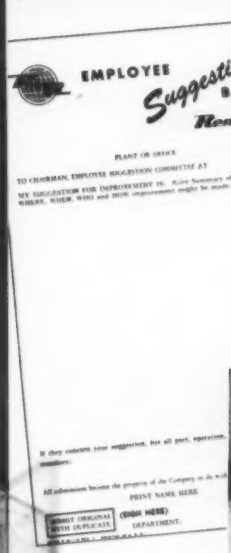
The Administrator is also responsible for details of the plan—maintenance of a central record of operation and performance, for cooperation with divisions and committees in the installation, maintenance and promotion of the plan. He cooperates with Committee chairmen and committees to insure a uniform program.

General Managers must cooperate with the Administrator. They are responsible for the installation and development of the Suggestion Plan throughout divisional plants and sales and service offices and for the appointment of a Committee chairman and personnel to carry on the Plan.

In each Remington Rand plant there is a Plant Employe Suggestion Committee, (General Sales and Service Employe Suggestion Committee is maintained at the home office, New York) under whose direction is appointed the necessary personnel for efficient operation of the system. Members of the Committee are chosen from the Engineering, Personnel, Production, Time Study, Accounting, Costs and Safety Departments, with one member from each unless specified differently by the General Manager, who may add one or more employes from a non-supervisory category. Such employe representation is rotated monthly and all members have the privileges of discussions and voting.

The General Sales and Service Employe Suggestion Committee passes on all suggestions from the fields of sales and service. General Sales Managers serve as Committee chairmen and are responsible for the operation of their phase of the Suggestion Plan. On the Committee are Sales Promotion Managers and other personnel selected for specific experience or knowledge, with the membership total always an uneven number. There is a Committee Secretary whose duties are varied and important.

One other committee group exists, namely, the Executive Office Suggestion Committee. This committee is formed along similar lines to the


ORIGINAL
EMPLOYEE
Suggestion
BLANK No.B 22900
Remington Rand
DATE
PLANT OR OFFICE
TO CHAIRMAN, EMPLOYEE SUGGESTION COMMITTEE AT
MY SUGGESTION FOR IMPROVEMENT IS: (Give Summary of Suggestion. Explain WHY, WHAT, WHERE, WHEN, WHO and HOW improvement might be made.)
If they concern your suggestion, but all part, operation, members.
All information becomes the property of the Company or its sub
PRINT NAME HERE
SIGN HERE
DEPARTMENT:

The men responsible for the good showing of Remington-Rand's Elmira plant are clockwise, starting at far end: F. D. Reed, Chief Tool Supervisor; E. M. Post, Personnel Director; D. D. Woermbke, Chief of Standards; W. J. Flannigan, Asst. Chief Accountant; J. M. Enyedy, Superintendent, Typewriter Manufacturing; W. B. Schultz, Superintendent of Adding Machine Manufacturing; C. N. Jackson, Chief, Product Design Engineering; George Bullen, Asst. General Manager (Chairman), and W. J. Olivey, Executive Secretary of Suggestion Committee. Also at table but not shown: F. W. Thorneley, Chief Inspector; and I. Gowdy, Ch. Methods Eng.

others, passing on suggestions originating in its own departments. Represented on the Committee are: the company's Treasurer, Controller or Assistant Controller, Head of field accounting, Personnel Director and any others selected for their experience or special knowledge. In all there are 14 committees.

Committee Rules

Certain rules apply to Committee behavior—each Committee chairman conducts the suggestion program under his jurisdiction; attendance of members or alternates is mandatory at all Committee meetings, as is punctuality. Personnel selected for these committees is allowed the necessary time for attendance at the meetings.

The man most responsible for the success of the Remington Rand Suggestion Plan is Fred A. Denz, one of the organizers and first secretary of the NASS in 1942. He has surrounded himself with men also enthusiastic about the Plan, who have worked untiringly to promote it successfully. Mr. Denz, Director of the suggestion division, is in charge of the entire Remington Rand Suggestion Plan operation. He reports all activities to B. B. Bond, vice president in charge of manufacturing and procurement.

At this company suggestions are submitted on triplicate sheets, the suggester retaining one copy for reference and identification. Suggestions are then passed upon by the proper committees, investigated and accepted or declined, the latter with an explanation of their unsuitability. The committee secretary then reports to the General Manager of his division, who reports to the Director of the suggestion division, who in turn, reports to the Administrator.

All Remington Rand domestic sales and service offices are represented. These vary in size from the General Sales and Service Committee, which receives over 3,000 suggestions yearly to a small photographic supply plant in Newton, N. J., employing only 100 people.

This company's largest plant is in Elmira where, in six years, workers won $91,954.75 for 3,533 usable ideas. In all there were 13,933 suggestions offered. This year Canadian plants are to be added to the company Suggestion Plan and in England and France suggestion programs are also being set up.

This company also places much stress on the importance of foremen participation in the plans. Approximately twice a year Mr. Denz meets small groups of all foremen in the plants. At these meetings there are instructive talks, films shown and every effort made to heighten importance of the Suggestion Plan.

Quarterly Review

As a further means of exchanging adopted ideas all General Managers, Managers, Committee Secretaries, the legal department and the safety department are offered quarterly review on all major suggestions. If an already adopted idea for one location has been used in another, the original Suggester is paid an additional award, the amount determined by the extended use of the idea.

Remington Rand had an interesting experience when it decided to hold a "Suggestion Day" on June 4th of this year at its Elmira plant. W. J. Olivey, Suggestion Committee Secretary, thought of the idea. The idea caught on well in the plant and was given much publicity—press releases for local newspapers, notices posted on bulletin boards in departments and an informative pamphlet and a suggestion blank given each employe. Foremen urged their employes to participate.

Doubled, Then Quadrupled

The volume of suggestions began increasing above normal amounts ten days before Suggestion Day. The daily receipts first doubled, then tripled and two days before the big day the volume quadrupled. There was some fear that nothing would be left for Suggestion Day. On June 4th, however, there were 1580 suggestions submitted. The plant was in jubilant spirits. About 50 per cent of the suggestions had come from men and women who had never before tried out an idea. Another notable thing was the high participation of female employees.

The Suggestion Committee reported that it will take two months or more before all the suggestions have been processed, but it is known that out of this exceptionally large number of ideas a large percentage is of better than normal quality.

At the first Suggestion Committee meeting held after Suggestion Day the Committee reported 274 suggestions processed, out of which 71 were accepted: five were tabled for further investigation. Cash awards for these accepted ideas amounted to $2780, and the company estimates the monetary savings from the 71 suggestions accepted as $24,136.69. Best of all, Suggestion Day stimulated participation in the Suggestion Plan and suggestions have continued to pour in at a far greater rate than previously.

The Westinghouse Suggestion Committee was started in January, 1949, and is composed of members of the Motor, Control, Copper Wire, Factory Service, Safety, Accounting and Industrial Relations departments. Men responsible for the success of this Plan are G. C. Cummings, Accounting; K. D. Jacobs, Motor; L. J. Sherwin, Control; C. L. Haggard, Copper; E. J. Turton, Safety; B. Hantman, Factory Service and E. G. Cowper, Secretary.

Suggestions are submitted on regular blanks and the date is noted and a number assigned by the Suggestion Committee. A copy of the suggestion is then returned to the Suggester in the form of an acknowledgment. A record card is then completed and filed according to the name of the Suggester, and the original copy of the suggestion is filed, pending investigation.

The investigation may consume some time and require comments from the Engineering, Time Study, Inspection and other departments. It may be necessary to close the suggestion temporarily until this investigation is complete, but no suggestion is rejected until it has received a thorough analysis.

If a suggestion is declined, the Secretary advises the Suggester of this action and explains why. If it is approved, the Secretary sends a statement to the department to which the suggestion applies and in return receives the form stating that the suggestion has been, or will be put into effect.

Over 6000 at Westinghouse

Award lists are prepared twice a month and after approval by the Division Manager are forwarded to the payroll department for checks, based on either 5 per cent of gross savings or 10 per cent of net savings, whichever is greater. These amounts are then added to Suggesters' gross earnings on their next pay checks for tax payment. Finally, the original copy of the suggestion and all relative correspondence are filed as closed. A suggestion must be re-opened at the end of a year to keep it eligible for an award.

Over 6,000 suggestions have been received at the Buffalo Westinghouse plant since the Plan began, and of these 30 per cent were accepted, with awards exceeding $8,000. Largest local award was $477.

At the first of this year the company management requested that a bogey be set, to be reached by the end of 1952, regarding the receipt of suggestions. In February the bogey was 160, the average before the strike. It is hoped that this figure may be increased 10 per cent each month until the end of the year. Company wide the estimated savings from suggestions in the last four years exceeds a million dollars.

In Front Rank

In an estimate of cost reduction for 1952 sent to Westinghouse headquarters of the most important items listed was the Suggestsion System, which it stated, would seem to equal more than the amount assigned to it.

While all employees are invited to submit suggestions, those in executive and managerial positions are not eligible for awards. Employes whose ordinary duties involve planning, or who have supervisory or technical positions, will be eligible for awards only when their suggestions concern matters outside their own assigned responsibility. Any doubts as to limits of assigned responsibility are settled by a group of three supervisors appointed by the Manager at the request of the Suggestion Committee.

Ideas seldom eligible for awards

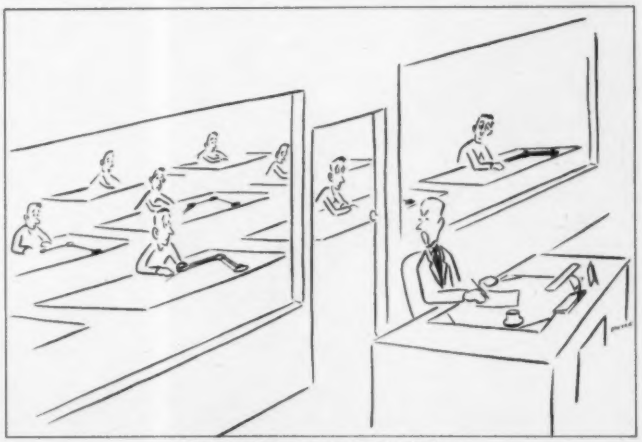
Winners of awards of $50 or more during 1951 at plant of Westinghouse Electric Corporation. Top row, first from left, is Tom Turner, Vice President; third from left is James Newman, Manager of Industrial Relations, Buffalo plant; Seated, Extreme right, is William Zenner who received a pin on behalf or his son in the Armed Forces

are maintenance problems which would be taken care of in the regular established procedure in a reasonable length of time, or for corrections of errors which cause waste of time or materials or of changes in lay-out, whose corrections have already been planned but not yet put in effect.

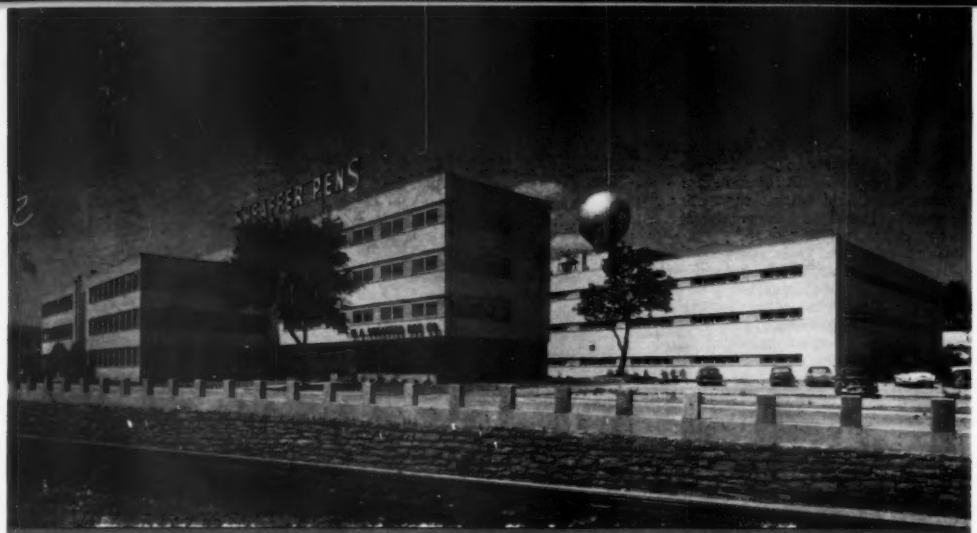
In all these companies much is made of award presentations. There are occasional dinners, always brief speeches and the successful suggester's story and picture are used in a plant publication, and even in a local newspaper when the event warrants further publicity.

Company executives agree enthusiastically that there are definite benefits derived from Suggestion Plans. In addition to the monetary savings for a company there is an appeal to the active and constructive thinking of employees. This personal participation in a company's operation is a stimulus to added effort on the part of every man and woman. Added to this satisfaction in seeing an idea put to work is the opportunity to earn extra money in awards. Employees become more alert to the machines on which they work and products which result. There is an added interest in their own department.

The exchange of ideas in these systems tends to a better understanding between labor and management and there is a more sympathetic approach by both of these industrial groups, with a common purpose and objective.



"I heard someone's pencil stop!"

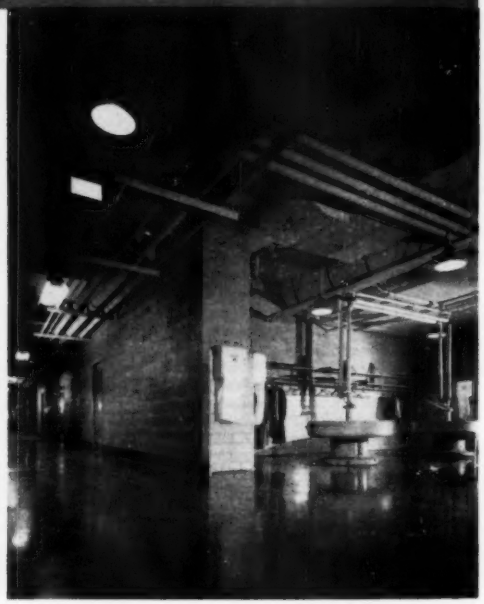


Exterior view of W. A. Sheaffer Pen Company's new integrated plant and office. Designed and built by The Austin Company, the new, four-story office wing, center, and three-story plant are of reinforced concrete construction and have been completely air conditioned. The new plant has been built around and over the company's old main plant.

Sheaffer Pen Company BUILDS NEW PLANT OVER OLD

To minimize initial installation costs all of the air conditioning equipment was located in two penthouses on the roof of the three-story reinforced concrete manufacturing building. Six built-up and six package type air conditioning units serve 25 separately controlled zones in the plant.

Although well-equipped locker rooms and toilet rooms have been located on each floor of the three-story plant, wash fountains, and clothes racks and shelving have been installed in open areas on two floors for the convenience of employees who prefer to use these particular facilities.



THE W. A. SHEAFFER Pen Company's new $3,250,000 plant in Fort Madison, Iowa, is now in full operation with all manufacturing departments housed in the old plant now in the building. This new plant is built around and over the company's old main plant. It was designed and constructed by The Austin Company.

Extending over an area of three city blocks the new plant gives the company a 30 per cent expansion in all manufacturing departments and provides room for an additional expansion later.

The manufacturing section of the building is on three levels; the office section is on four levels. The plant has 165,000 sq ft of floor space; the office 40,000 sq ft. The new office unit connects directly on its first three floors with the office unit built in 1937. Together they provide 67,000 sq ft of floor space.

Layouts of the manufacturing and office units are as follows: First floor —Plastic moulding department, plating department, metal fabrication department, finished stock department, order department, shipping department, carton storage, gold reclamation activities, waste paper baling and storage, garage for company cars and two-story boiler room.

Second floor—The second floor is at the approximate level of Avenue G, at the west side of the plant, and is considered the main floor. All factory personnel enter the plant on this floor. At this level are the general receiving truck court and the following: Cafeteria with seating capacity of 400, repair department where about 2,800 pens and pencils daily are serviced and shipped the same day they arrive, tool room, first aid section, apprentice room, maintenance department, inspection and quality control department.

Third Floor—Gold nib department, pencil department, pen assembly department and plastic fabrication department. The initial requisite for the manufacturing unit was that all departments would be assigned a surplus area sufficient to accommodate a 30 per cent expansion in production.

The four-story office addition is 44 ft wide by 192 ft long. It connects directly on the first three floors with the old office unit. The composite unit is completely air-conditioned.

The lobby, which follows the new trend of making the interior seem to extend outdoors, is a striking feature of the building. Its windows extend from floor to ceiling for the entire exterior perimeter of the room, affording a panoramic view of the Mississippi.

On the first floor, also, are the purchasing department and IBM department, with acoustical walls and ceilings. The second floor accommodates manufacturing supervisory offices and engineering, industrial design, methods and time analysis departments as well as a pilot plant where newly developed production equipment is given simulated plant production tests.

The third floor is assigned to sales activities and also contains a large meeting room accommodating 200 people with a display area. The fourth floor contains the executive offices and the advertising department.

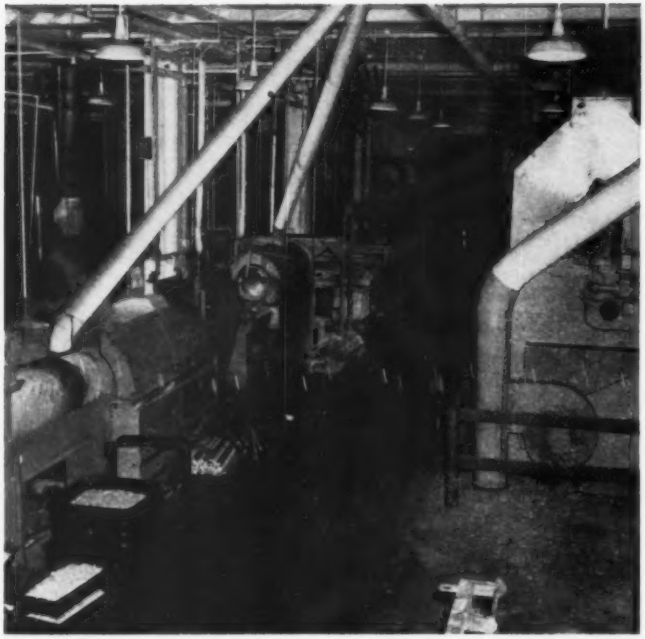
A building unit in the block west of the new plant, formerly the engineering department and tool room, has been remodeled to accommodate the laboratory, development department and personnel department.

In addition to the most up-to-date equipment for manufacturing the products, the plant provides extensive facilities for employee comfort, welfare and safety.

A total of 186,000 cubic feet of air is supplied to the manufacturing building every minute, enough to change completely the air in the building every 10 min. Of this, about 125,000 cfm is taken from outdoors to provide fresh air.

Row after row of large motor-driven grinders like these have been installed in the plastic fabricating department. These machines do the precision work in finishing plastic parts extruded in the molding department. An interconnecting monorail system handles grinding wheels

Meals and mid-shift snacks served to the employees in the 400 seat cafeteria are prepared in this well-equipped, modern kitchen where virtually all activities can be fully observed from the manager's office. Another corner window looks out on the cafeteria's serving line



Long ducts, connected with ventilating equipment, exhaust steam-laden air from barrel drying units in the plating building of the Wagner Electric Corp. plant

HEATERS Keep Plating Room Air Clean, Warm

MAXIMUM EFFICIENCY in removing toxic fumes from metal plating operations to assure a safe and comfortable working atmosphere has been achieved by the Wagner Electric Corporation, St. Louis, by the installation of two air-tempering, direct-fired space heaters in the plating shop.

The problem confronting the company's plant engineer was how to replace large volumes of air which had to be exhausted to carry off fumes in the plating building. It was not critical in warm weather when air entered open windows and doors for natural ventilation, but during the winter, cold outside air would chill the working area and make it uncomfortable.

To solve this problem, two gas-fired Dravo heaters were installed, one against the south wall and one against the northwest wall. Both take their air supply from the outside through louvered wall openings, and discharge heated air during cold weather and fresh air during warm weather into the working area. Each heater has a capacity output of 2,000,000 Btu per hour and handles approximately 22,000 cu ft of air per minute.

Control for each heater is a thermostat which actuates a modulator for the gas burner in accordance with temperature requirements. The heaters thus provide a constant supply of some 44,000 cfm of fresh air, the air being tempered in the winter so it does not chill the building interior. The heater fans are also operated in warm weather (with the burners off) to circulate fresh air brought in from the outside.

Introducing this large volume of fresh air into the building prevents ventilating equipment from causing negative pressure which retards the efficiency of gas-burning devices and slows down the exhausting of fumes.

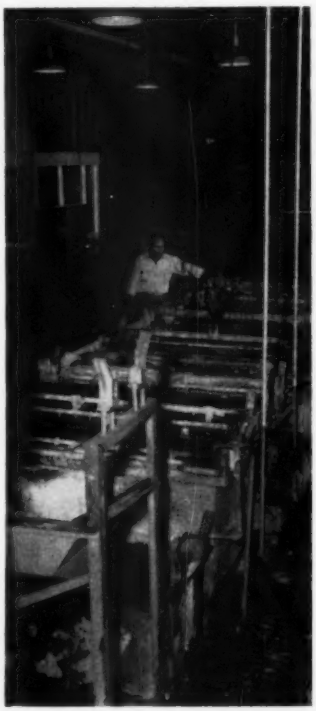
Ducts from three 30-in. American Blower blowers provide individual venting for tanks and plating equipment. Some of the ducts are hooded; others terminate at points where fumes are given off. Fumes from the remainder of the shop are exhausted by one 42-in. roof ventilator, three 24-in. roof ventilators and several gravity ventilators.

In operation, air enters the base of the heater casing and first passes over two staggered banks of economizer tubes carrying exhaust gases to the vent stack. In this way, the heat value remaining in the gases is utilized.

Inside the tubes there are twisted "swirlers" that swirl the gases to make heat transfer more effective. After passing over the tubes, air then sweeps the stainless steel combustion chamber and is discharged through four lovered outlets on top of the heater casing. The outlets can be adjusted to control the direction of air flow from the various unit heaters.

At Wagner Electric, plating operations have improved the appearance and lengthened the service life of component parts manufactured for automotive brake systems.

Component parts before they are plated are electrically cleaned, rinsed, pickled and rinsed again then zinc plated and rinsed once more before given a bright dip in 1 per cent nitric acid solution. For aluminum, a 20 per cent sulphuric acid solution is used. In pickling, a 5 per cent sulphuric acid bath is employed.



Fumes from these plating operations cause no hazards to health or comfort of workers—fumes are exhausted and fresh, heated air is supplied to plant

These men stand ready with a 40-gal chemical extinguisher to smother a possible gasoline or oil fire when motors are started

Fire-Fighting Equipment Paid Its Way in Less Than 5 Years

By installing fire-fighting equipment to comply with insurance requirements, Pan American received a lower fire insurance premium . . . This helped pay for the installation in less than five years . . . In addition, the fire equipment and trained personnel help maintain operations at the base on a business-as-usual basis

By W. E. ADAMS, Plant Maintenance Superintendent,
Pan American World Airways, Latin American Div., Miami, Florida

THE REDUCTION in the fire insurance premium was sufficient to pay for the cost of the fire protection installation at Pan American World Airways, Latin American Division, Miami, Florida base. Although the physical installation paid for itself in less than 5 years, the greatest value was in the continuing assurance of the company staying in business without a major interruption.

Certain insurance companies accept only low risk insurance. Plant fire protection had to conform with insurance requirements. As insurance brokers assured the company they would be able to arrange for such a policy, Pan American installed equipment that would comply with all the rules. In fact, at some points the installation is in excess of the requirements, but the added safety precaution was taken to doubly insure the continuance of business as usual.

The base at Miami is actually divided into two parts. One installation is along the northern side of the International Airport, and the other installation, known as Component Overhaul Base, is southwest of the airport terminal on the opposite side of the area.

Equipment Installed

In the Overhaul Base area 17,000 sprinkler heads were installed in 6 buildings; on the International side, 2000 deluge heads were installed in the hangars and 4100 sprinkler heads were installed

Fire scooter, equipped with extinguishers, is used to get to fires in a hurry

throughout the rest of the base.

The Overhaul Base area has two 400,000 gal reservoirs besides a primary 16-in. city water main. On the International side, adequate water for the system is provided by three 24-in. wells and a 150,000 gal reservoir. This system required the availability of 9000 gal of water a minute which is supplied by 4 pumps. These can be driven either by diesel or electric power.

In spite of the installation of automatic fire sprinkler and deluge systems, stand-by pumps, and the availability of two types of power, the blood stream of the automatic installation is the inspection conducted by men making the rounds on a regular beat.

Two men from Plant Engineering inspect these installations continuously. There are periodic patrols of unoccupied space. Fire doors are checked. Inspectors check to see that unauthorized containers are not used. They make sure that fire equipment is in operating condition.

Portable display of hand extinguishers acquaints personnel with their proper use

DO YOU KNOW YOUR FIRE EQUIPMENT?
PLAY IT SAFE
BE PREPARED
A YES YES NO NO NO
B YES YES YES YES YES
C YES NO YES YES YES
DISCHARGE TIME 45 SECONDS 60 SECONDS 45 SECONDS 30 SECONDS 8 SECONDS
EFFECT

Pumps are tested twice a week; alarms are rung once a week. The same inspectors watch to see that ground wires are attached to planes.

The first line of defense of course, is the hand equipment. Over 1600 pieces of fire extinguishing equipment have been installed at a cost of approximately $35,000. Three men are assigned to maintain the extinguishing equipment, plus a hose cart, and a fire truck. These men also make sure that sand buckets are located wherever lathes are used in turning magnesium. Throughout all the buildings 1½ in. hose coils have been installed.

The prevention of a fire, or the spread of a blaze cannot be assured by hand containers or automatic equipment alone. With this thought in mind, the company feels that the only real safeguard is the prompt action of trained personnel.

Fire Classes Held Weekly

This phase of the plant fire protection is considered so essential that two fire classes are held each week and include all ground personnel. These classes continue year 'round and are repeated each year. Plant personnel are trained section by section. Repetition each year instructs the new men and acts as a refresher course for the older employees.

All men are taught how to handle small equipment, where hoses are located and how to turn them on. A specific crew is assigned to each hose cart.

Basically the men are taught, first, to call the fire department, and second, take an extinguisher and use it on the initial blaze. Generally the right type of extinguisher for the probable cause of a quick fire is the one at hand.

The fire protection activity for the plant personnel does not include crash equipment which is handled by special crews.

All of the usual rules of fire prevention such as the use of smoking areas and smoking breaks are enforced.

In addition to the plant's own complete installation, the County Airport facilities are available on call.

The focal point of all installations and personnel training has been to avoid fires getting started. Stress on this point has proved successful. During the past 3 years no blaze has occurred that could not be handled with a fire extinguisher.

Although the lower rate of fire insurance has paid for the installation that fortunately has not been put to major use, the real dividend from the training and the protective equipment has come through the continuous operation of the plant. No insurance pays for the loss of service from machines, or the cost of canceled flights.

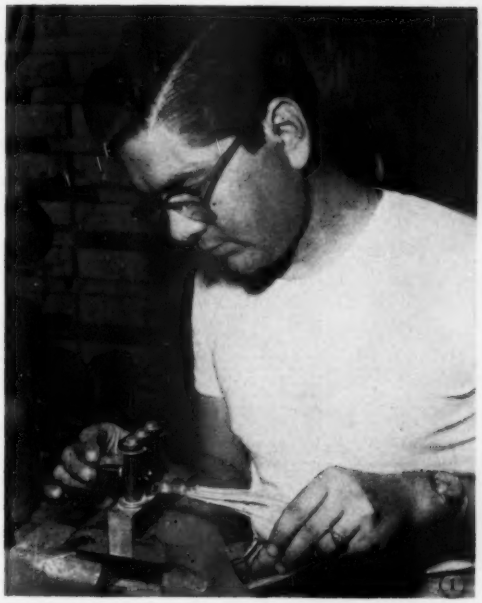
From 8 Hour Job to 6 Minute Breeze —Story of One Small Device

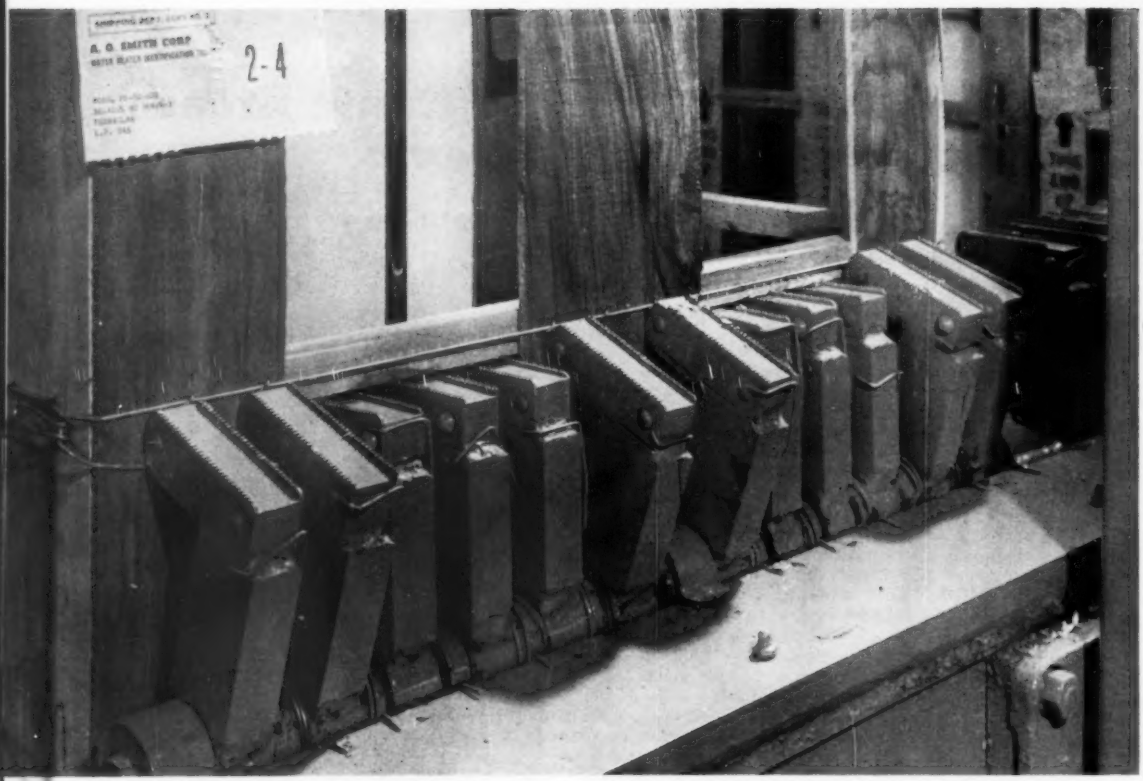
Brains and ingenuity still pay off as proved by the fact that this Lockheed man has cut time for a job to 1/80th its former length

LOCKHEED AIRCRAFT at Burbank, Calif., has a young inventor, Joseph Savona, who got tired of sore fingers. Threading a wire harness through a plastic insulating cover is one of the most laborious and time-consuming jobs in industry. Mr. Savona, for example, has covered harnesses up to 150 ft long that took several days when the work was performed in the conventional manner.

The final solution to the problem was the second one worked out by the Lockheed man. His first solution was to run a stiff wire through the plastic cover, blow compressed air through the tubing to expand it and then pull the harness through with the wire. But it took too long this way, too.

His second solution was to attach a short length of wire to the end of the harness. See Photo 1. On the other end of the wire was a rounded metal "bullet" which was inserted in the plastic tubing. See Photo 2. Third step, shown in Photo 3, was to pull the insulation between rollers through which the bullet could not pass. Manufacturing officials at Lockheed thought so much of Mr. Savona's invention that an application has been filed for patent rights.





Truck fingers in position to lift crate. Six fingers under horizontal cleat will support entire weight of heater and crate

TRUCKS with Lift More Crates

By DON E. HARTQUIST, Plant Engineer
Kankakee Works, A. O. Smith Corporation

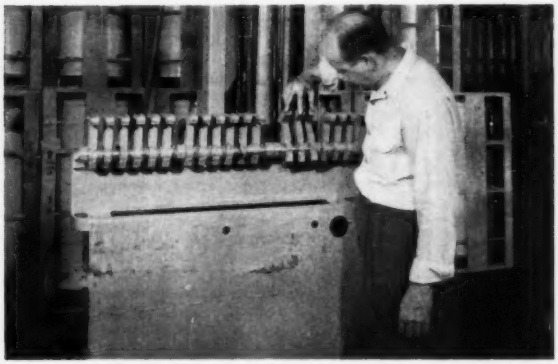
AN EXTREMELY IMPORTANT PHASE of the materials flow through the Kankakee plant of the A. O. Smith Corporation is the handling of their finished product, domestic water heaters. As the final step in the assembly line, the heaters are crated in slat-type, wire-bound crates, and lift trucks pick them up for transportation to storage or loading into rail cars.

As originally designed, this handling was to be a palletizing, transporting and stacking operation, using conventional fork trucks. As production increased, however, it was found that this handling phase was becoming the production bottleneck in the entire plant operation.

In spite of an abundance of labor, thousands of pallets, and sufficient mobile equipment, the heaters could not

Lift truck carrying 3 crated heaters enters car door to load

Crated heaters are spotted for tiering by side-shifter unit



Basic units of the lift. Easily-depressed fingers do the work

"FINGERS" at Lower Cost

be handled into cars or storage as fast as they were coming off the assembly line. As an additional problem, storage space was partially wasted because of the air space around each heater. Some models could be loaded 4 to a pallet, but most of the larger models had to be stored 1 or 2 to a pallet. At one time, it required 170,000 sq ft of floor area to store 18,000 crated heaters.

Before—5 Men Required for Loading Heaters

Loading cars from storage presented as difficult a problem. A crew of 5 men was required for loading the heaters into rail cars from storage. Two men climbed on the stack of heaters, and as the truck moved in with an empty pallet, the men pushed crated heaters onto the pallet. The driver took this load to the car, where 2 more men were waiting to unload the pallet, sometimes working atop the first tier of crates. This intermittent use of manpower, with one team at each end of the truck run, was exceedingly uneconomical.

The adoption of a unique attachment for the fork trucks, made up of "fingers," proved to be the answer to the majority of these handling problems. With the attachments, considerable material benefits have been realized.

One truck driver, with no helpers, can handle the same number of crated heaters in 7½ hr as the 5-man crew had difficulty in handling in 10 to 12 hr. He can load a rail car in 15 minutes, just one quarter the best time of the 5-man crew.

Use of Pallets Eliminated

Pallets have been completely eliminated, and product damage that had been caused by crates falling off pallets on moving trucks, has become negligible. Five operators, driving five 1500-lb capacity trucks fitted with the finger lift attachment have replaced the 20 drivers and helpers previously required. Now, about half the time, the heaters are picked directly off the final assembly crating line, and loaded into rail cars. The labor force required to repair handling-damaged heaters has been reduced from 9 to 2 men, and a total force reduction of 22 men has become possible. Direct labor savings alone have amounted to over $100,000 every year.

The finger lift attachment is simple in design and construction. A series of short spring-loaded fingers, on a horizontal shaft, are so mounted that slight pressure on the finger tips causes them to retract, by tilting backwards. A vertical apron, below this shaft, serves as a backup or rest, for the lower portion of the load. The entire assembly is mounted on the cross bars which carry the conventional forks on a lift truck.

How Fingers Operate

In operation, the truck moves forward until the apron meets the crate. With the truck against the crate, some of the fingers protrude between the vertical slats of the crate, while the remainder are backed out of the way. The truck mast is raised and the fingers between the slats engage the horizontal cleat in the crate. The rounded ends of the fingers facilitate the sliding of the unengaged fingers on the slats which hold them retracted.

On either side of each finger, lengths of standard saw blades are fastened, with the teeth of the blades extending about ⅛ in. above the top of the finger. These teeth bite into the wooden cleat when the crate is raised, thus providing the required resistance to the force tending to pull the crate forward, off the fingers.

As an additional time and effort saving innovation, a hydraulically-operated side shifter was installed on the truck. This feature enables the driver to position the crates horizontally as well as vertically, as he loads them into the car, or stacks them in storage.

Multiple handling of the crates with the finger lift has proven highly successful. With the smaller sizes of water heaters, operators can handle three crated units at one time, with a great saving in handling time.

With the advent of the finger lift, the confusion, shipping errors, high labor cost, excessive maintenance of equipment, and damage to the finished product all dissolved into an orderly and organized operation.

There are a great many plants or facilities today throughout the country which have been conceived, planned and engineered for the manufacturing of a specific product. The A. O. Smith Corporation's water heater manufacturing plant, in Kankakee, Illinois, is one of the classic examples of this modern trend in industrial planning.

Preventive Maintenance Program Warns of Needed Repairs on Time

Three steps are suggested for a workable preventive maintenance program: . . . 1. Analyze the job . . . 2. Set up procedure for securing necessary tools to do the job . . . 3. Follow through to see that job is carried out

By **ELMER HOLTZ**, Plant Engineer, Igleheart Brothers, Pendleton, Oregon

PREVENTIVE MAINTENANCE means making necessary repairs, in an orderly and systematic fashion, before equipment reaches the breakdown stage. The big question is just when to make the needed repairs. Only people trained to recognize when repairs are necessary can give you the answers.

Here are three steps which will lead to a well-integrated preventive maintenance program: 1. Make a survey and analysis of the jobs that need to be performed; 2. Set up a procedure for procuring the necessary materials to do the job; and 3. Follow through to see that the details of the job are carried out.

As you analyze the maintenance techniques of your plant, be sure to consider the following:

The director of maintenance program should be someone close to management. His experience and good judgment are very significant factors where the economy of an effective maintenance program is reflected on financial returns. Management, realizing the importance of this phase of its operation should select competent heads to supervise carefully the carrying out of an effective and continuous program with a minimum curtailment of production.

A complete record of all equipment and plant facilities should be kept so that the requirements and range of the maintenance program can be summarized properly. Then a systematic appraisal of the maintenance program's functions, in order of relative importance, can be made. The record can be broken down into such functions as inspections of fire protective equipment, of heating and ventilating facilities, of building and roof maintenance, and of machinery repairs and lubrication.

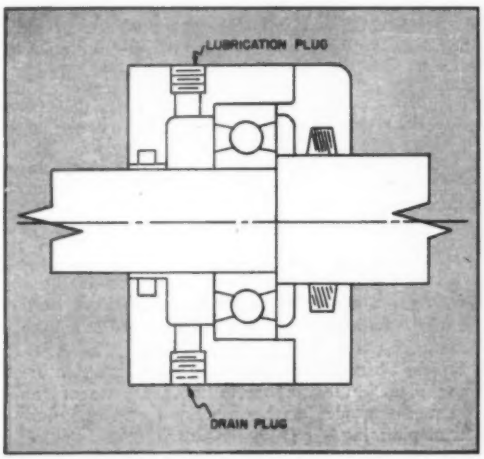
In setting up a maintenance cost history, the accumulated records are a good source of information on which to base future budgets for maintenance operation. While this is not readily applicable to those maintenance problems which are customarily met in ordinary running repairs to equipment, it is valuable for such stock replacement repairs as anti-friction bearings, V-belt drive parts, and other types of equipment that constitute stock repair items.

An efficient and economical maintenance program requires a certain amount of good planning. The maintenance program must be planned to assure a minimum of downtime in the plant operation. Effective planning to relegate less important maintenance problems to their proper sequence is also very essential.

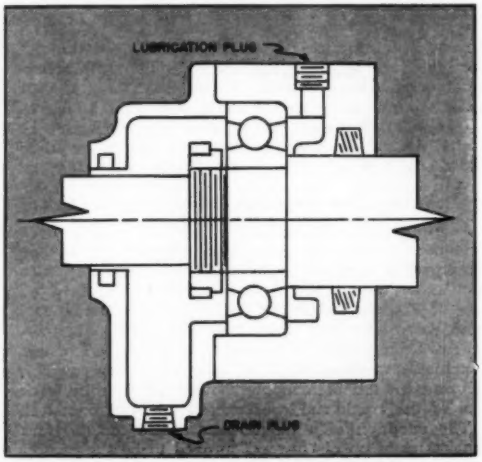
If the problems at hand are to be recognized, it is necessary to have a skilled work force and the necessary tools, equipment, and good shop facilities for carrying out an effective program. Supplementing this is the cooperation from the employees operating the machines in reporting those items requiring maintenance attention. For instance, the oiler in a flour mill is in an excellent position for constantly making these observations. Spotting the weak spots and the most vulnerable pieces of equipment in the plant operation is a big factor in forestalling breakdown repairs.

The life of the machinery in the plant depends very much upon the

By having lubrication plug on top side of cartridge and the relief plug directly underneath it, a build-up of pressure on the bearing proper and grease seals is prevented



With this improved design, the lubrication plug is installed on one side of the bearing and the relief or drain plug on the opposite side. This design eliminates over-lubrication



selection and use of the proper lubricants. The manufacturer of the equipment usually suggests a lubricant, but often the selection is left to the judgment of the operators. The petroleum industry has many trained engineers in the lubrication field who can give good advice on proper lubricants for any particular job where the specifications are not given or not specific.

As time goes on, we find more and more mill machinery equipped with anti-friction bearings. The proper lubrication of this type of bearing usually requires the careful attention of a competent maintenance man. In the case of enclosed electric motors, we find divided opinions on how anti-friction bearings can be lubricated most effectively.

The majority of totally enclosed type of motors on the market today have a grease reservoir in the bearing cartridge to facilitate the lubrication job. A number of these motors has a lubrication plug on the top side of the cartridge and directly underneath, a relief plug in the bottom of the cartridge where the excess grease can escape. Thus an eventual build-up of pressure on the bearing proper and on the grease seals is prevented. Many maintenance men are dissatisfied with this type of bearing lubrication. The net result is that they have adopted a practice of dissembling motors at regular intervals and hand-packing the bearings.

A very timely remedy for this situation is advocated by Fafnir bearing engineers. Instead of having the lubrication plug on the same side of the bearing as the drain plug or pressure relief plug, they suggest that the lubrication plug be installed on one side of the bearing and the relief or drain plug be installed on the opposite side.

With this method of lubrication, the user can select better greases and have all the advantages of long periods between greasing. All the grease also passes into and through the ball bearing. Since this arrangement provides for an ample sump into which the surplus grease can vent, there is very little trouble from over greasing.

This design supplies the grease from a point closely adjacent to the face of the ball bearing on one side. The interior of the bearing housing on this side is so shaped that the grease reaches the points where it will do the most good. On the opposite side of the ball bearing, ample space is provided for the bearing to eject the excess grease.

This method of lubrication has a number of economies. It minimizes the number of times required to dissemble the bearing cartridge and to hand-pack the bearings. It also practically eliminates the danger of overlubrication which can cause excess heating and rapid bearing failures.

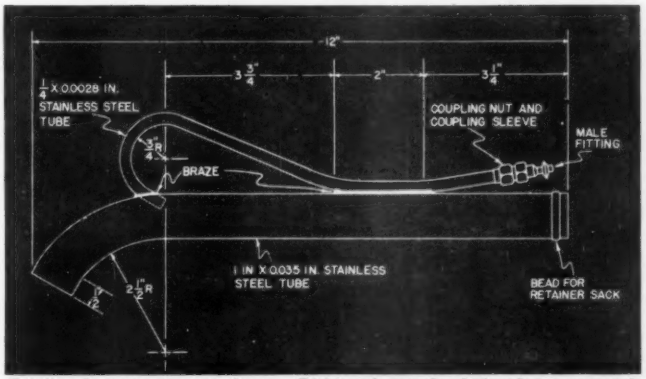
Very often it is necessary to make changes on newly installed machinery before it functions properly. The judicious selection and proper installation of the best designed and best suited equipment for the job often eliminates the breakdown and upkeep expense of this equipment.

Small Vacuum Cleaner for Out-of-the-Way Places

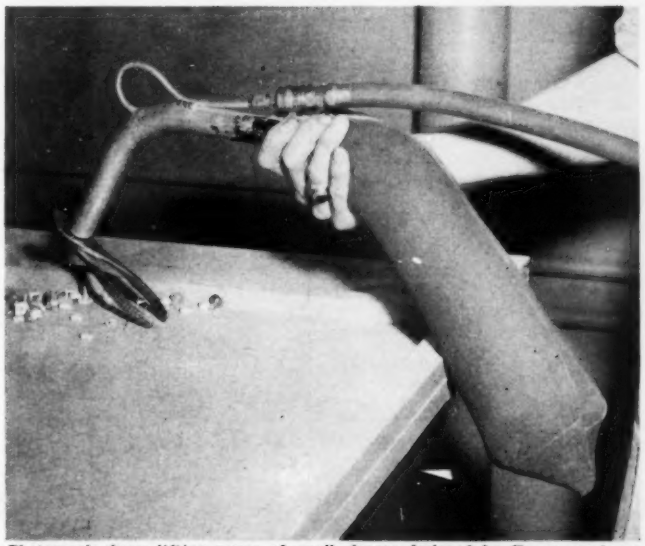
A POWERFUL VACUUM cleaner which measures only 12 in. overall length is the newest employee-designed tool in standard use at Temco Aircraft Corp's. overhaul division at Greenville, Tex.

Designed for use in wing fuel tanks and other hard-to-get-at places the cleaner has demonstrated its efficiency in cutting down cleaning time by almost half in addition to reaching places previously inaccessible to vacuum cleaners. The main tube is made of 1 in. stainless steel pipe measuring 9 in. from bend to bag and with a 3 in. radius in the bend at the nozzle. The pipe is beaded to allow attachment of a bag to catch flying rivets and pieces of metal.

Welded to the main tube is a ¼ in. pipe with a 1½ in. loop delivering air directly down the straight portion of the main tube and creating the vacuum at the nozzle. A male disconnect fitting allows the cleaner to be used anywhere in the plant.



Details of construction of cleaner. Right end may be designed for any sack



Photograph shows lifting power of small cleaner designed by Temco employee

SPECIALIZED ELECTRICAL MAINTENANCE — What It Offers the Plant Engineer

Several articles over the past few years have discussed the question: "Should Maintenance by Contract Be Encouraged?" . . . Both the British and American plant engineers gave their viewpoints on the question* . . . Author tells how it looks from other side of the fence . . . Discusses services a maintenance company has to offer

By WALTER J. PRISE, Chief Engineer, The Maintenance Co., Inc., New York

IN TODAY'S industrial world there is a definite need for special service. This type of service is connected with those problems that do not occur often enough or are of a highly specialized nature. There may be a need for a very special jig in a plant which will expedite production or maybe it is essential to change the operation of an old machine by redesign of its electrical control.

Repair jobs on special equipment require highly specialized knowledge and to obtain and keep such men on the payroll of the industrial plant would not be practical or economical. Consequently, these jobs can be better performed by an outside organization entirely devoted to this type of service.

Examples of Jobs Performed

Following are just a few examples of the many unusual jobs which are performed by this maintenance company.

On the big direct current elevator machines the turning down of a commutator presents quite a problem. This machine must be dismantled, armature taken down, brought to the shop, placed in a lathe and turned down. This is a very expensive job. To reduce the cost, a special jig was constructed for turning down the commutator on the plant premises. This jig consists of a cutter and steady rest which can be attached to the frame of a motor. Movement of the steady rest is performed by the cranking attachment between the shaft and feed screw, as shown in the sketch.

One brushholder was removed and replaced with the cutter located exactly at electrical neutral of a commutator. This position must be maintained at all times to eliminate burning of a cutter tip and damage to the commutator. A 4 brushholder motor operated successfully on 3 sets of brushes while this job was performed. It is important to be sure that the speed of the motor does not exceed speed of cutting recommended for such an operation in machine shop practice.

Regrooving a Sheave

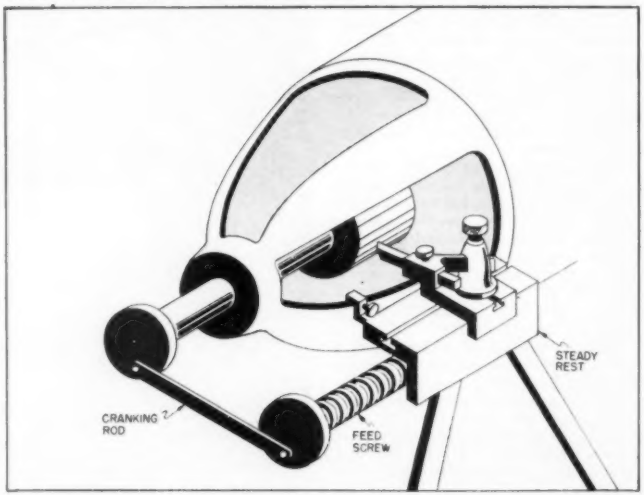
Similar to the job of resurfacing a commutator, regrooving of a sheave on a gearless traction elevator is expensive if the sheave must be removed from the premises and brought to the shop. In the regrooving of a traction machine sheave, a jig somewhat identical to the one described in turning down the commutator was used. However, due to difference in material and higher stresses placed on equipment used, a stronger designed unit was needed. The main point to remember in such an operation is to determine if there will be enough metal left in the body of the sheave after the operation is completed.

Another service job performed by the maintenance company was for a popular home magazine. The magazine operates a large test kitchen to test performance of all types of household appliances and special testing facilities were needed to determine the amount of current consumed by electrical appliances.

After field data were collected and basic requirements were determined, engineers designed a test board which possessed the following characteristics: Constantly regulated voltage which was accomplished by the introduction of a large automatic induction voltage regulator. This constant basic voltage makes the job of comparing performance of various appliances easier.

Power is furnished by a 37.5 kva insulating indoor transformer, which supplies 120 v single phase alter-

Steady rest is used for turning down commutator of a motor under its own power by removing one brushholder. Eliminates need of taking motor into shop



*The first part of this article, the British viewpoint, appeared in the July, 1949 issue, of Plant Engineering, page 40. The second part, the American viewpoint, appeared in the September, 1949 issue, page 42. The third part, covering more of the American viewpoint, appeared in the January, 1950 issue, page 42.

nating current line to the main test panel. The transformer with five connecting taps on primary winding can be changed as desired to obtain variation in voltage output.

The test panel has 20 circuits, each protected by a magnetic circuit breaker. Extra large size RH type wire was used in wiring individual circuits to reduce voltage drop. An electric clock enables all tests to be electrically timed. The board is equipped with a number of indicating wattmeters, ammeters and voltmeters, which can be connected by means of a selector switch to any circuit. In addition to these instruments, integrating wattmeters will give measurement of power consumed during each test.

To provide a record of temperature, the panel is equipped with a precision temperature indicator. The temperature range of this recorder is from —50 F to + 550 F. Thermocouples, in circuits, provide indication of variation of temperature.

Part of Test Board Is Portable

Part of the board is made portable. This section is mounted on rubber wheels and can be moved to any part of the test kitchen. Silver contact switches were used throughout this design.

Record of current and power consumption plus record of temperature and time necessary to perform certain cooking operations give the staff of experts employed by the magazine enough data to compare various appliances for benefit of its readers and for scientific files of the magazine research department.

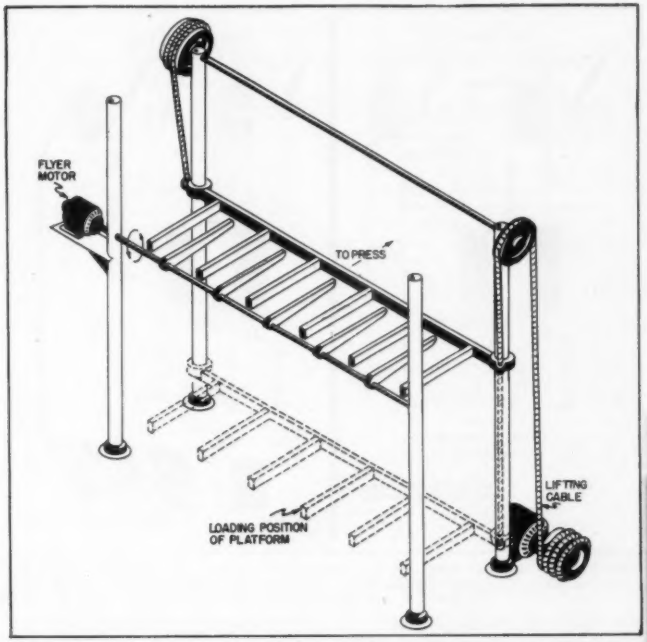
On another job, the company developed a unique mechanical arrangement for the paper feeder of a large press manufacturer which permits continuous feeding of paper without interruption. This was accomplished by a special feeder platform which moves up and down to load and discharge the paper.

In this set-up, the special flying platform comes in when paper load is low. The main platform lowers for reloading. The flyer gets out of the way as soon as the last sheet of paper on top is used and comes back when paper supply is low again. This arrangement required development of complicated electrical circuits with many sensitive relays and interlocks.

Policy Dispensing Machine

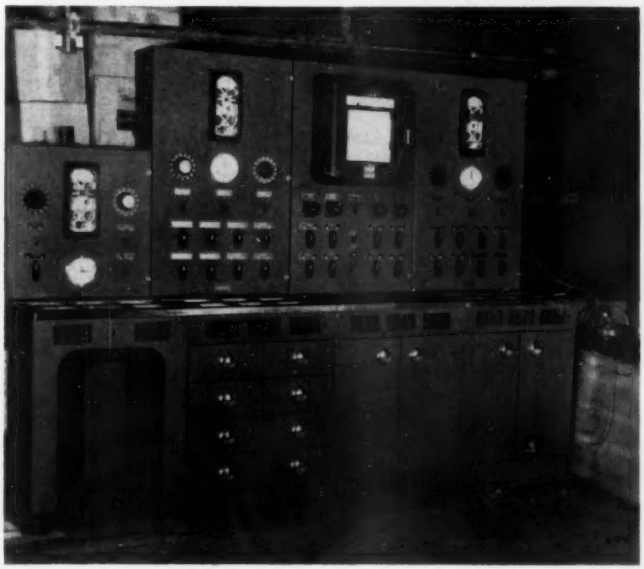
Another example of the different problems which are handled is the service performed on a policy dispensing machine. The machine did not keep accurate record of policies issued; wrong policy could be obtained at times; and customers were losing coins after machine went out of order. The following circuits were introduced to correct these incidents:

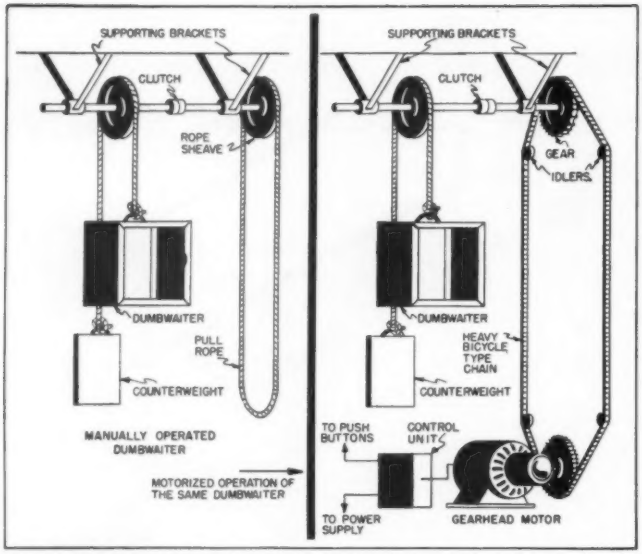
1. Bookkeeping system counts all operations individually also in units of five. (Five different policies can be issued on this machine.)
2. Test circuit provides a record of number of test operations procured without deposit of coins. Previously, testing operations were counted among other issues and check on income was difficult.
3. Special sequence wheel selects



This special feeder platform was designed to permit continuous feeding of paper without interruption. Platform moves up and down to load and discharge paper

This appliance test board was designed by the company to test performance of all types of household appliances indicating amount of current consumed by each





Sketch shows manual operation of dumbwaiter before and electrical operation after redesign. This was accomplished at a fraction of the cost of a new unit

the value of policy. Formerly, if this wheel got out of order wrong policy could be obtained for wrong price. The new circuit provides interlock in such a manner that the wrong policy cannot be issued and, if the wheel gets out of order, the machine will stop and reject future deposits.

4. Machine will stop by means of a new electric interlock if length of paper of policy—due to a defect in delivery mechanism—delivered to a customer is less than the specified 10 in.

Service Extends to Dumbwaiters

Another service extended to a ship on short stay in the Port of New York. They wanted to motorize the manually operated dumbwaiter. As can be seen in the sketch, the old arrangement of driving power to the unit was provided by rope hanging on the side of the dumbwaiter. This rope was applied to a big rope pulley on the top end of the shaft. The pulley was mounted on the shaft which, through the clutch, connects with sheave to which counterweight and dumbwaiter were connected.

In redesigning the equipment, rope and rope sheave were taken off the shaft. They were replaced by a gear and heavy duty bicycle type chain. For safety and to eliminate the possibility of too much noise 4 idlergears were introduced to keep chain under needed tension, beyond reach and also to reduce vibration.

The chain is connected with gear head motor located at the bottom of dumbwaiter shaft. Speed of dumbwaiter after modernization was 21 fpm. Speed reduction from 1700 rpm was accomplished through gear reducer and also by changing ratio between top and bottom gears.

By introduction of interlocks, motor would not operate if doors were open and doors cannot be opened until car arrives at specified level.

Control equipment was located under the car next to a motor. Bicycle chain drive provided steady drive and eliminated possibility of slippage. Besides installation of electrical equipment all that was necessary for changeover was replacement of pulley by a gear, introduction of idlers and interlocks. Installation of entirely new equipment would have required complete removal of all existing units and replacement with a new dumbwaiter. This electrification of the dumbwaiter was accomplished at a fraction of the cost of a new unit.

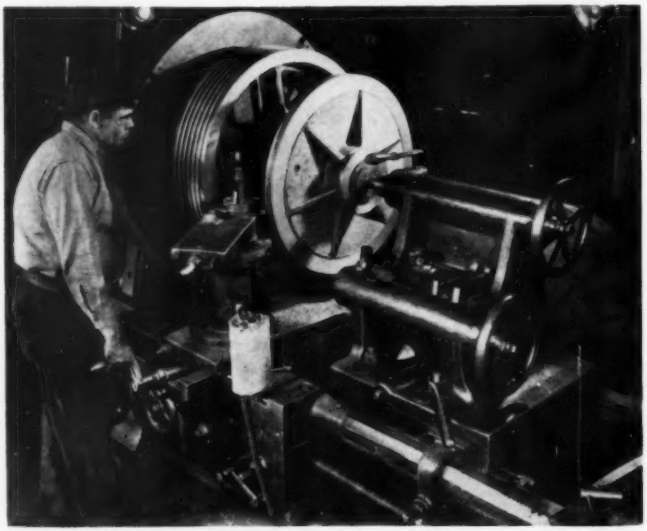
Other Services Performed

Under certain conditions of operation the slip rings on wound rotor alternating current motors become pitted and must be renewed at a considerable expense. By experimenting with different methods and alloys the company found it practical to metallize such rings with a new layer of metal instead of installing new rings. This operation, due to care exercised in selection of metal, provided a surface which wears well and blends nicely with atmospheric conditions at the plant. Wear on slip rings and brush troubles were practically eliminated.

Various electric repair jobs are performed in the electric shop. When a damaged motor comes into the shop for repairs, the receiving department records the name plate data and all information describing the trouble, incorporating report of mechanic on a special form for the job.

The damaged unit is then taken apart and by means of visual inspection or special tests exact nature of damage is determined. After the motor is stripped of old insulation, its frame is cleaned by chemical solution in special tanks provided for this purpose.

Winding data are either taken at the time of stripping of old coils or



The operator is machining a large elevator cable sheave. The company is equipped with machinery such as this which must take care of a variety of jobs

taken from extensive files of engineering records. New coils are made in accordance with such data, using specified type of wire. Coils are taped and insulated and are made ready for insertion in either stator or armature, whatever the case may be.

After stator or armature is wound with new coils, the complete unit is dipped in insulating varnish and baked in an electric oven for specified number of hours. The finished units are assembled and tested on dynamometer under full load and overload. After it is given dielectric test, insulation resistance test, it is assembled, painted and shipped to the customer.

Due to the very high demands for safety in elevator operation, occasionally codes governing operation and installation are changed, prohibiting continuation of certain conditions. Old conditions become violations under the new rules and must be removed within a certain time limit. Such removal of violations must be made on existing elevators and sometimes present many electrical and structural problems, such as compensation for weakening of existing structures, etc., and must be compensated by ingenuity and high skill on the part of the person performing such work.

On certain elevator machines, low voltage results in inefficient and sometimes dangerous operation, leading to overheating of units. Same applies to low power factor. The maintenance company is equipped with a set of graphic instruments and the customer can get a complete condition of his line voltage, load, fluctuations and variation of power factor, if a survey using such instruments is made at his plant.

Charts of the instruments constitute permanent record which can be used to determine the nature and time of annoying conditions. Quite often results obtained from such an investigation lead to corrections which eliminate waste and provide trouble-free operation.

The company handles both electrical and mechanical problems and has a large engineering department, machine and electric shops.

The shops are equipped with machinery to take care of a variety of jobs. The machine shop has many lathes—from those capable of handling large sheaves and elevator drums to small ones where precision jobs are performed.

Overhead cranes facilitate handling of work. Hydraulic presses are used for dismantling and assembling of units. Milling machine, power saw, shapers, drills and many special devices complete the picture of equipment used in the machine shop. Electrical and gas welding and metallizing are also available.

In the electric shop test boards and dynomometers permit test at different frequencies and voltages. Burn-out oven, complete line of winding equipment, fire-proof vault for dipping of finished armatures, etc., in insulating varnish, electrically operated and thermostatically controlled and many other special machines constitute the equipment in the electric shop.

Unit Heaters Step Up Production of Wire

THE INSTALLATION OF gas-fired unit heaters for lacquer drying made it possible for the Holyoke Wire and Cable Corp. to secure a 50 per cent increase in the production of radio hook-up wire.

This wire manufacturer faced a difficult production problem during the early months of 1950. Radio hook-up wire, from 10 to 26 gauge, was selling in constantly increasing volume. Plant layout and equipment could keep pace with demand up to the point where a flame resistant lacquer was applied over the glass or textile covering. The lacquer room could not keep pace with the braiders, and hook-up wire production could not keep pace with sales.

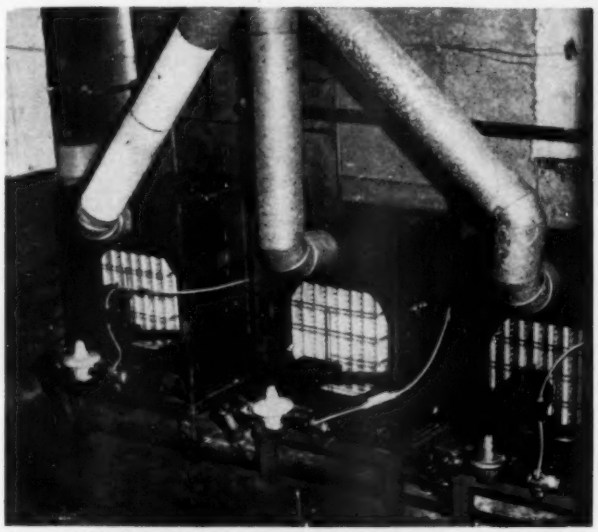
In May, 1950, a gas-fired unit heater supplied by The National Radiator Co. was installed in the lacquer drying tower. Production immediately picked up. In July of that year a similar unit heater started to dry lacquer in a duplicate drying tower. A third unit heater, in a third tower, was put to work a few months later, and the knotty production problem was solved.

The three-heater schedule for lacquer drying is a 24-hr production day, 5 days a week, with 1,500 ft of wire passing each minute out of the drying tower and on to the take-up reels. The fuel cost is approximately $5 per unit heater, per day.

The gas-fired unit heaters, having 215,000 Btu input per hour and 172,000 Btu hourly output, are installed near the base of the drying towers. Fans on the units have been removed. Their air movement was unnecessary since an exhaust fan was required to dispel lacquer fumes from the towers.

Fire insurance regulations required that 10,000 cu ft of fresh air pass through the towers for every gallon of solvent evaporated in the cable coating lacquer.

An airstat, mounted in the hot air duct leading to the tower, controls the gas unit heater which is providing a 130 to 150 F air temperature to surround the lacquer coated wire as it passes repeatedly up and down in the drying tower.



Three unit heaters, each one mounted near the base of a lacquer drying tower. A central exhaust fan provides adequate air circulation for the job

Plant-machine layout includes an 87 ft derrick for field-testing drilling tools . . . A machine-high dolly which rides on tracks from receiving station to punch press . . . Jib booms near machines handling 40 lb . . . And method of tracing production with red and black lines

Derrick Field-Tests Tools at Plant

Working oil derrick, rising over test laboratory (circle), permits company to field-test drilling tools right at the plant. This derrick stands over a well—actually drilled 100 ft deep to the water table. Oil tools are tested during development and when in actual production by running them down into the well

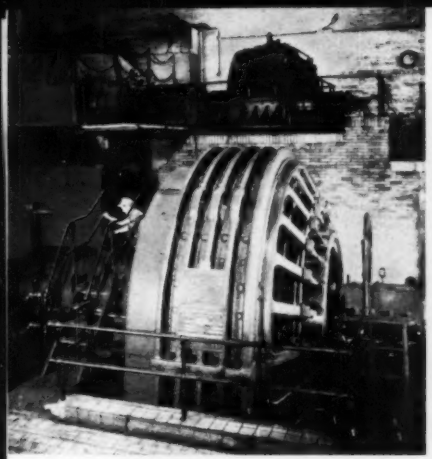
THE NEW PLANT of Baker Oil Tools, Inc., in east Los Angeles, was built and designed under the supervision of its own engineering staff, and under the direction of the plant engineer, Tom Ragan.

There are 6 important plant-machine layout features incorporated in this new plant. They are: (1) Plant has a workable, life-size, production-type, oil well derrick erected in the test laboratory, with its rig towering above the plant. This permits on-the-spot check of specialized oil tools. (2) Nine production lines progress at right angles off a 685 ft craneway (receiving section). There is no handling of metals from the receiving section to the production line. (3) Individual jib booms are erected nearby machines handling heavy materials over 40 lb. (4) Main production area is laid out with as nearly straight-line production as is to be found in today's medium-sized manufacturing unit. Fully 90 per cent of the manufacturing processes move ahead, with no doubling back for machining steps. (5) Pneumatic message system ties office, production and shipping together; (6) Corrugated iron construction and light, saw-tooth roof allows maximum light.

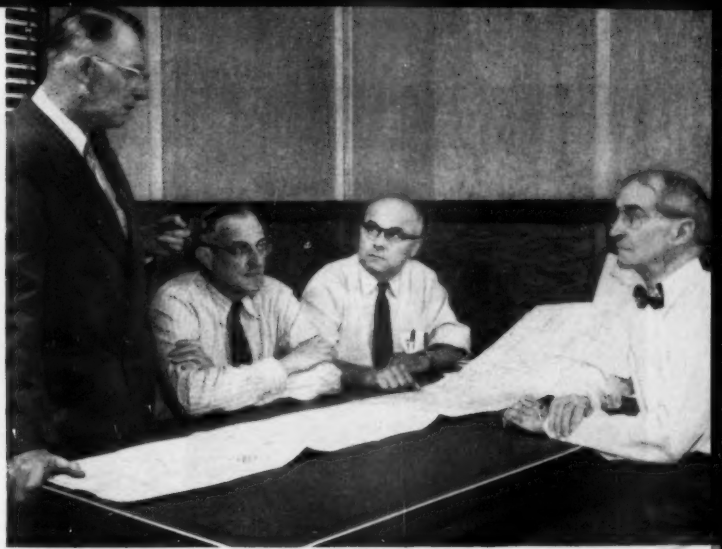
The 87-ft oil well derrick, which rises from the test laboratory, stands over a well—actually drilled 100 ft deep to the water table. Oil tools (which include guiding, floating and cementing equipment; casing shoes; casing centralizers; scrapers, etc.) are tested during development and when in actual production by running them down into the well. The big derrick has at least one functional use besides testing: it acts as a hoist for handling long casings and pipes.

Other test-department machines, all specially developed by the engineering staff, include: 7500 psi hydraulic pump, which exerts high pressures on the tools—simulating actual oil well conditions; a 400 F steam chamber—keyed to temperatures found at great depths during drilling operation; and many others.

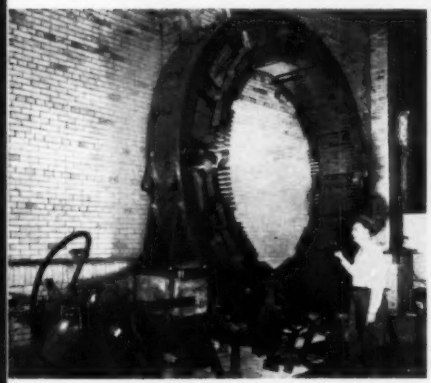
The first production step for several tools is cutting steel bars and



Complete spares are kept for these key motors—a 7000-hp reversing-mill drive motor and the slabbing mill's 1650-hp d-c screwdown motor.



Wheeling Steel's equipment reconditioning program at Steubenville was planned by its superintendent in charge of operation and maintenance of electric equipment, James Farrington (right). Helping him are (right to left) George Merrick and Henry Ford, assistant superintendents, and (standing) Karl J. Doll, manager of the G-E Apparatus Service Shop in Pittsburgh.



Ready to replace any of 3 generators in the plant's main motor-generator set (already reconditioned) is this spare 2400-kw generator frame.

Motor pool comprises smaller spare motors, all reconditioned. Full information on each motor and its location is maintained in an equipment record system.

Standby renewal parts for electric equipment are kept in this storage room, one of several at Wheeling.

***Productive* Maintenance** "kit" contains helpful maintenance literature, plus "tools" that help sell management on need for full maintenance program.

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Here's how to develop management support for <u>your</u> maintenance program

Wheeling Steel Corp., of Wheeling, W. Va., shows what maintenance men can really do with full management support. "Our successful maintenance program," says J. H. McElhinney, operating vice president, "was devised and supervised by our maintenance department" and plays a major part in keeping output high.

To help *you* present your maintenance story to the top men in your plant, General Electric offers a new *Productive* Maintenance program. Its spearhead is a kit of maintenance information that helps you *prove* how Productive Maintenance can raise *your* plant's output. For your kit, contact your nearest G-E Apparatus Service Shop or write to General Electric Co., Section 801-8, Schenectady 5, N. Y.

GENERAL ELECTRIC

Jib booms are rigged near machines where more than 40 lb are lifted. These booms have helped to speed up production

Machine-high dolly moves on tracks that extend into receiving area. When loaded, it is wheeled back to machine

straps to size on punch presses (there are 6 of these punch presses, sized up to 90 tons). These presses are the first machines in the production line and they are installed immediately off the receiving warehouse.

Instead of toting raw material by lift truck to the cutting machines, each punch is installed with tracks leading from it, and extending 20 ft into the receiving section. Riding these tracks are specially-designed racks, each machine-height, and some 22 ft long. The racks are pushed along the track by lift trucks to the receiving station where the 2 bridge cranes, 6 ton and 5 ton, load them. The racks (4 ton capacity) are then pushed back to the punch presses ready for the operators.

Jib booms have been installed adjacent to all machines requiring lifting of heavy metals. Time and efficiency studies by the plant engineer set the criterion that if a worker had to lift more than 40 lb at a time, a jib boom should be installed near his machine.

Booms are rigged with ½ to 2 ton hoists. Booms themselves were shop-fabricated from old oil well casings, with thrust bearings installed where the 6 in. I-beam boom swivels on the casing. Average boom length is 9 ft. Jib booms are anchored in 5 ft deep holes, and imbedded in concrete with lugs welded onto the casing to tie them more firmly into the concrete.

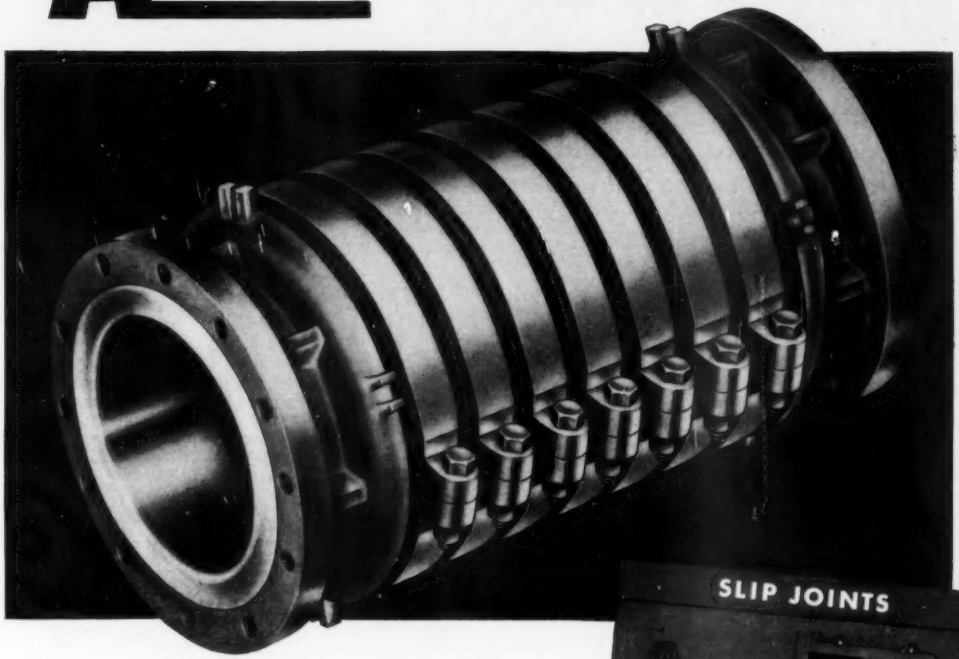
In designing the plant-machine layout, the plant engineer added a rather unique step to the template layout board technique. Once he had the templates of the various production machines laid out in their approximate locations, he huddled with engineers and production heads and traced each of the products from start to finish.

As he did, he drew a black line from machine to machine as long as the production moved forward. Whenever a part backtracked to a machine not in straight line production, he drew this deviation in red. Red lines meant need for repositioning machines. The end product is 90 per cent black line—or continuous, straight production.

Scrap, incidentally, is collected and segregated in discarded ore buckets, which have been palletized so they can be moved by plant trucks. Ragan terms the ore buckets, "The best scrap collectors I've ever seen," and wishes he could lay hands on a half dozen more.

Here is one of the discarded ore buckets the company uses for collecting scrap. The buckets have been palletized to permit easy handling by plant trucks

ADSCO EXPANSION JOINTS



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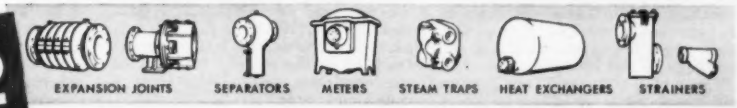

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SELECTION, USE AND CARE OF TOOLS

Auxiliary Pipe Tools—The wise selection, use and care of auxiliary pipe threading tools—cutters, reamers and vises—will result in longer tool life and better tool performance

By **THOMAS TRAIL**, Maintenance Engineer

AUXILIARY TOOLS used with pipe threading tools include cutters, reamers and vises, and are available in several styles and patterns.

Pipe cutters of the type shown in Fig. 1 can generally be used with either a single cutting wheel and 2 rollers or with 3 cutting wheels. The former arrangement possesses the advantage of leaving a smooth external surface on the pipe end which requires little or no smoothing to accommodate the threading dies. The latter arrangement is employed in locations where the cutter can be rotated only a part of a circle.

These cutters are made in various grades. Some have malleable iron frames, tapped to accommodate the handle screw; others are provided with a nut to adjust the handle screw, and have no threads in the frame. Another type is equipped with a reinforced steel housing; while still another is furnished with a rugged heat treated alloy frame. On some types the movable wheel or roller holder is arranged to slide on the frame. In other types it is hinged. Cutter wheels are available in several types: smooth-edge, tooth-edged, thin wheel, heavy duty wheel, and wheel for cast iron pipe.

Cutters of the wheel type are made in various capacities, covering pipe size ranges from ⅛ to ¾ in. to 9 to 12 in. Some of the larger sizes are provided with 2 handles, to permit use by 2 men.

Figure 2 shows a knife type pipe cutter. This cutter cuts like a lathe tool, and leaves little or no burr on the inside of the pipe, and none on the outside. The cutting knives are fed automatically by heavy spring pressure, and a safety depth guide is provided ahead of the cutting knife edges to prevent jamming and breakage of the knives.

These pipe cutters will cut, groove, and bevel pipe. A different set of knives is employed for each operation. Knife type pipe cutters are made in size ranges of ⅛ to 1 in. and ½ to 2 in.

A ratchet knife type pipe cutter, employing the same features, is made for pipe sizes from 2 to 4 in. This cutter has a split circular frame, to permit its use on running lines, risers, etc.

Threading oil should be employed when using a knife type cutter, and the cutter should be rotated continuously in the proper direction.

Geared type pipe cutters of the same knife style are made in size ranges of 2 to 4 in. to 9 to 12 in. Some have split frames for use where the cutter cannot be slipped over the end of the pipe.

Wheel type cutters are usually operated dry, though the bearings and movable parts should be lubricated periodically, to insure easy operation and reduce wear. When using a wheel type cutter, engage the pipe and move the cutter back and forth several times through only part of a circle, to insure proper tracking of the cutting wheel, then go completely around the pipe, if conditions permit.

When cutting wheels or knives become dull, they may be resharpened, if facilities are available, or replaced with new ones. Likewise, replacement of worn rolls, pins, washers, and handle screws and nuts will help keep the cutter in good operating condition. Care in handling the cutter will prolong its life.

Reamers used to remove the burr left on the inside of pipe cut by some types of cutters are made in a variety of types and several sizes. Some are provided with a bit brace shank, Fig. 3, or a round shank or T handle. These may be had with either straight or spiral flutes, and are made of carbon steel.

Self-contained reamers of the type shown in Fig. 4 are made in ratchet and non-ratchet types. Some have solid forged cutters, while others have inserted cutter blades. Both straight and spiral fluted cutters are available, some being made of carbon steel, others of alloy steel. One type employs a ratchet handle that can be used interchangeably with threading die heads.

A reamer should be handled carefully to avoid chipping the flutes, and fed into the pipe with moderate pressure. Spiral fluted reamers cut with a shearing action and are less liable to chatter, but are more difficult to sharpen than are straight fluted reamers.

Pipe vises are made in several types and sizes. The type shown in Fig. 5 is employed where fast clamping action is required. A variation of this type is equipped with a clamp that permits it to be temporarily attached to a pipe, post or bench, making it portable.

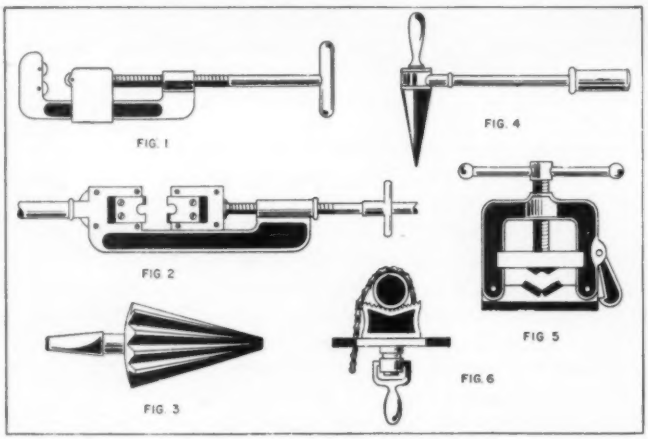
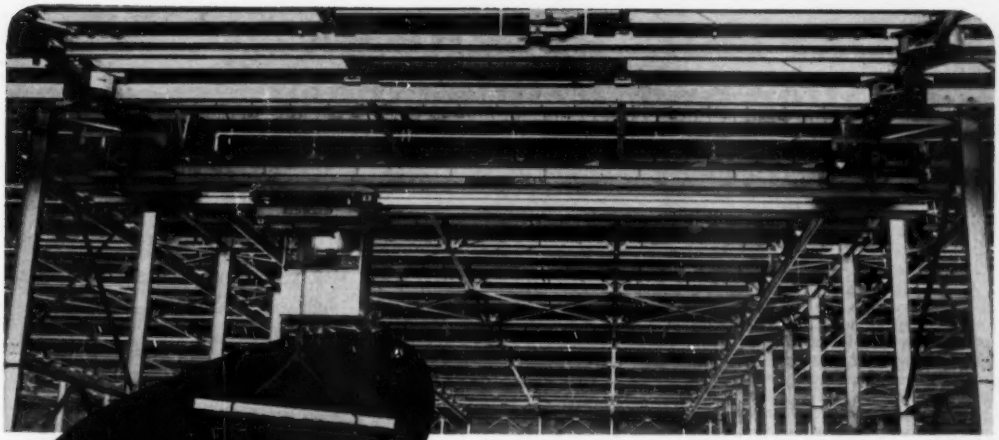


Figure 6 shows a chain type pipe vise. Some of these vises are made to be fastened to a post, as well as to a bench. One pattern has the operating handle on top of the vise for easier operation.

Some pipe vises are provided with integral lugs for bending pipe.

In using a pipe vise, clamp the pipe tight enough to prevent slipping and consequent injury to the pipe surface or the vise jaw teeth, but not tight enough to crush or deform the pipe.



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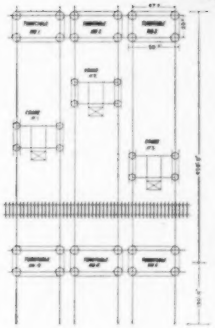

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ABSORPTION REFRIGERATION— Operation and Maintenance

Article discusses recommended ammonia liquid level in absorption systems . . . How various operating pressures are controlled . . . How to charge system with aqua ammonia . . . And, how to remove non-condensable gases

ABSORPTION refrigeration systems differ considerably from compression systems, in that a liquid pump is employed instead of a gas compressor and the arrangements of equipment are more complex, as shown in Fig. 1. For this reason the successful operation of absorption refrigerating equipment requires a knowledge of the operating and maintenance details peculiar to this refrigerating process.

Since the absorption system generally employs steam to heat the generator, a steam pump is usually provided, though other types of pumps may be substituted, provided that the output can be readily controlled. The steam pump usually used is the simplex type. In the latter type pumps the ammonia cylinder is provided with a long stuffing box surrounded with a water box.

Proper Liquid Levels

When the absorption system is operating regularly, and properly charged, the ammonia liquid levels should be as follows:

In the tubular type absorber, at the center of the regulator; in the atmospheric, double pipe or multi-tube absorber, several inches below the center of the regulator. In the generator, one to two inches of aqua ammonia covering the steam coil, in the type having closed end steam tubes; and about 4 in. below the center line of the analyzer, in the steam shell type having an analyzer above the shells. No liquid should show in the separator, indicating proper drainage of ammonia solution back to the generator.

The liquid level in the anhydrous ammonia receiver should be constant at any height in the glass desired, 4 in. being satisfactory. This level is controlled by the proper adjustment of the evaporator expansion valve.

The proper liquid level in the evaporator is about three-fourths full. This is very important since economical and full capacity operation depend on it. In the multipass tubular type evaporator, the proper liquid level is indicated when all three liquid level indicating pipes show frost. In the single pass type evaporator, a gauge column connected to the evaporator indicates the level.

It is well to inspect ammonia gauge valves periodically for stoppage, which will cause a false level indication.

The condenser operating pressure is controlled by the temperature and quantity of cooling water admitted, and, assuming that the water surfaces of the condenser are clean and that the ammonia is free of non-condensable gases, the pressure should range from about 120 lb at 55 F water temperature to about 190 lb at 90 F, or a rise of about 10 lb for each five degree Fahrenheit rise in cooling water temperature.

Operating Pressures

The pressure of the ammonia in the generator is usually 2 or 3 lb higher than the condenser pressure.

The evaporator pressure will, of course, correspond to the ammonia temperature.

The pressure in the absorber is controlled by the quantity of cooling water admitted to it, and is usually 1 to 3 lb lower than the evaporator pressure. The water surfaces should be kept clean and the ammonia free from non-condensable gases.

The generator steam pressure should be adjusted to suit the cool-

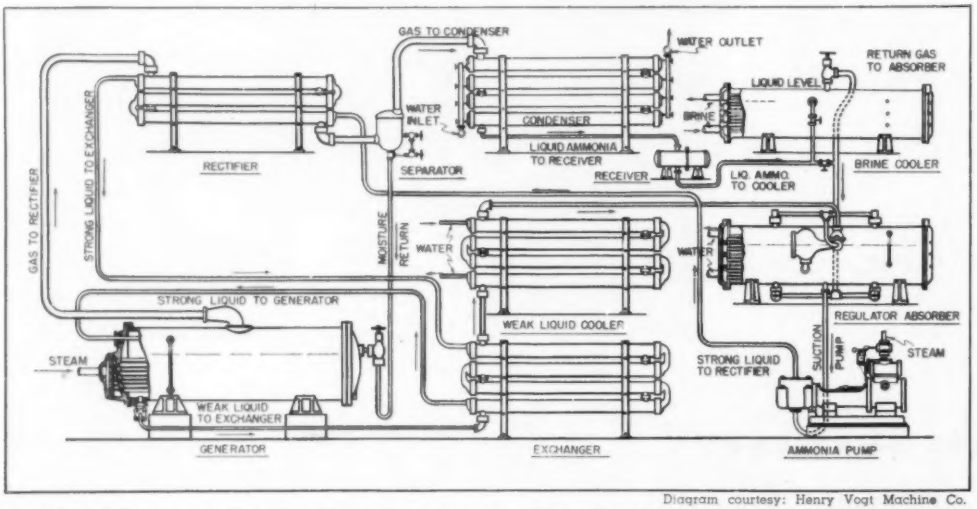

Diagram courtesy: Henry Vogt Machine Co.

Fig. 1. A knowledge of the absorption system is important for the successful operation of refrigerating equipment

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ing water temperature, brine temperature, and the strength of the strong liquid. The steam pressure required ranges from 1 to 34 lb, at a strong liquid strength of 28 Bé taken at 60 F temperature, and a brine temperature 14 to 17 F, when the cooling water ranges from 55 to 90 deg. An increase in steam pressure is necessary when the brine temperature is carried lower than 14 to 17 F, or if the quantity of cooling water is reduced, or if the strong liquid strength is decreased. Where equipment is designed for lower temperatures, such as minus 10 F or lower, the original specifications of the equipment manufacturer should be consulted to ascertain the proper steam pressure to be carried.

The air vent valve on top of the generator steam chamber should remain slightly open at all times, to keep the steam coils free of air. It will also indicate if the steam trap fails to drain condensate.

Controlling Strength of Liquids

The strength of the strong liquid in the absorber is controlled by the temperature and quantity of cooling water admitted, since this controls the temperature and pressure of the liquid. Thus the colder the liquid and the higher the absorber pressure, the stronger will be the liquid.

The strength of the weak liquid depends on the temperature of the liquid in the generator and the generator pressure. The higher the temperature and lower the pressure, the weaker will be the liquid.

In general, where the absorber pressure is 15 lb, the strong liquid should show a strength of at least 28 Bé at 60 F temperature. The weak liquid, not more than 24 Bé at 60 degrees F.

Since it is usually not practicable to test the strength of aqua ammonia at the standard 60 F temperature, testing should be at machine temperature and corrections made by consulting a table of corrections for temperature of aqua ammonia. Do not pour or agitate the ammonia samples, as evaporation produced will lower the temperature.

In charging the system with aqua ammonia, connect a hose to the pump suction line and submerge it in the liquid in the drum. Shut the valve in the pump suction line between the absorber and the charging connection and open all stop valves in the pump discharge line to the generator. Start the ammonia pump gradually, then open the line valve from the drum. If the pump fails to draw the liquid, prime the suction connection with water, or make a temporary connection between the pump discharge line and the absorber drain, thus avoiding pumping against the generator pressure.

In loosening the aqua ammonia drum plug, if the plug is loose and can be easily shaken, the drum is free from pressure, otherwise the drum may require spraying with water for at least 12 hours to reduce the temperature sufficiently to prevent loss of aqua and gas from the drum opening. For this reason, drums should be stored in a cool place.

To charge the system with anhydrous ammonia, connect the cylinder valve to the charging valve on the liquid feed line to the evaporator, using pipe or special armored hose made for this purpose. Elevate the end of the cylinder opposite the valve end about 2 in., as shown in Fig. 2. Follow the instructions on the cylinder tag exactly when making connections.

Then close the evaporator expansion valve, and gradually open the charging valve carefully to test the tightness of the charging connection. If tight, open the charging valve wide, then open the cylinder valve gradually until the charging connection frosts. Continue opening the cylinder valve slowly until the frost begins to disappear.

When the bottom of the connection end of the cylinder begins to frost or the cylinder produces a singing sound, the cylinder is practically empty and the cylinder valve may then be opened wide for 5 to 10 minutes. Then close the cylinder

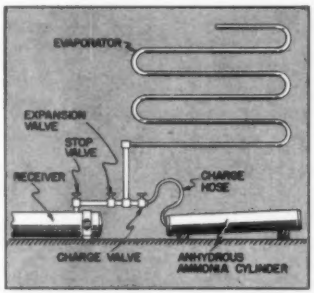

Fig. 2. Method suggested for charging the system with anhydrous ammonia

and charging valves, open the expansion valve to regular position, and disconnect the cylinder. Plug the open end of the charging valve with a steel plug.

If the generator pressure increases 30 to 40 lb above normal working pressure while charging, due to the closed expansion valve permitting the receiver and condenser to fill with liquid ammonia, reduce the generator steam pressure until charging is completed and the expansion valve again opened.

The method recommended for starting and stopping one type of exhaust steam heated absorption system, assuming it has a proper charge, is as follows:

To start, open the generator steam connection stop valve gradually, admit cooling water to the condenser, absorber and weak liquid cooler. The generator must be warmed up slowly to avoid undue expansion strain.

Next, see that all valves in the gas line between the generator, rectifier and condenser, and in the liquid line to the anhydrous receiver, are open, as well as all valves in the strong liquid line between the absorber, ammonia pump, rectifier, exchanger and generator.

Steam Pressure Build-Up

Build up the steam pressure gradually until the ammonia pressure on the generator reaches 80 or 90 lb, then start the ammonia pump slowly. Then immediately open all weak liquid valves between the generator, exchanger, weak liquid cooler and absorber, permitting the regulator to control the weak liquid flow to the absorber.

If a brine system, start the brine pump or agitator. Immediately open all valves in the gas return lines between the evaporator and the absorber, and open the various expansion valves slightly to maintain a constant liquid level seal in the anhydrous receiver.

The required generator steam pressure may be controlled either by means of a pressure regulating valve or by hand.

To stop the system, shut steam off the generator and open the steam condensation outlet drain valve to relieve generator steam pressure. Then close the anhydrous ammonia expansion valve or the stop valve, and operate the system for some time to reduce the liquid level in the evaporator and thus provide gas space to take care of liquid expansion.

It is very important never to close a valve leading to or from any coils, pipe line, shells, evaporator, brine cooler, receiver or pump cylinder while full of aqua or anhydrous liquid ammonia. Liberal gas space must be left to take care of the expansion of the liquid, to prevent the raising of excessive pressure.

After the generator pressure drops 20 or 30 lb, stop the ammonia pump. Then immediately close the weak liquid line valve feeding the regulator on the absorber. Close the valve in the gas return line from the evaporator, stop the brine pump or agitator (if a brine system), and shut off the cooling water supply to the system.

Non-Condensable Gases

To remove non-condensable gases from the high pressure side of the system, except where the condenser is of the atmospheric drip or flooded type, the preferred method consists in the shutting down of the system and reducing the condenser and rectifier pressures to 60 to 70 lb, as explained later, thus drawing the non-condensable gases into the ab-

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sorber where they can be easily purged off.

Where the condenser is of the atmospheric drip type, the valve in the liquid line from the condenser to the receiver should be closed. The non-condensable gases should then be purged from the top of the condenser and the receiver through the equalizing line from the top of the condenser to the top of the receiver. Purging should be done for 10 to 15 minutes about every 2 hours, but not after the high and low pressures are reduced by purging.

Non-condensable gases may be removed from the low pressure side of the system most effectively just before the system is shut down, and after the low pressure side of the system has been pumped down, as previously described. After closing the expansion valve, close the gas return valve between the absorber and evaporator, then shut the steam off the generator. Run the ammonia

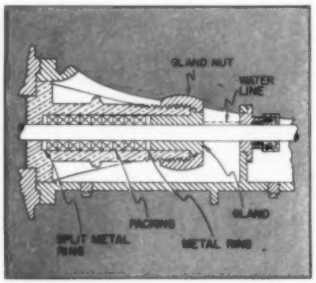

Fig. 3. Sketch shows how the ammonia end of the pump should be repacked

pump for at least 15 minutes, circulating the liquids through the absorber and generator and thus absorbing the ammonia gas in the absorber, leaving only the non-condensable gases. Then stop the ammonia pump, open the purge valve on the absorber, and permit the absorber to fill with weak liquid through the regulator bypass, if provided. The non-condensable gases will thus be forced from the absorber. When liquid begins to flow from the purge valve, quickly close the weak liquid line valves to the absorber to prevent high pressure on the absorber. Start the ammonia pump at once and pump down the absorber liquid to working level, then stop the pump and shut down the rest of the system in the usual manner.

To avoid a vacuum on the absorber while shut down, which would likely draw air through the stuffing boxes, open the valves in the gas return line between the absorber and evaporator and, if necessary, open the expansion valve slightly for awhile until about 5 lb pressure is applied to the absorber, then shut the valves.

In purging non-condensable gases, they may be discharged through a hose into a bucket of water. Avoid releasing too much ammonia gas. Ammonia causes a sharp cracking noise and usually turns the water a milky color, producing only a few bubbles, whereas non-condensable gases cause a rolling sound and produce numerous bubbles.

When necessary to reduce pressure in the condenser, shut off the generator steam, close the valve in the gas line between the rectifier and condenser, and expand all anhydrous liquid ammonia to the evaporating side of the system. Then close the expansion line stop valve and the return gas valve from the evaporator.

Have water flowing through the absorber and weak liquid cooler while pumping out the condenser. As the condenser pressure is reduced, open the valve in the bypass line between the anhydrous liquid line and the return gas line to the absorber very slowly. Keep the ammonia pump running and the weak liquid flowing through the absorber. This will draw the gas from the condenser into the absorber, thus reducing condenser pressure to zero.

Reducing Generator Pressure

To reduce the generator pressure, temporarily increase the steam pressure, thus distilling off as much ammonia gas as possible. The anhydrous liquid ammonia produced may be stored in the evaporator, if sufficient expansion space is provided. Next, close the expansion line stop valve and the generator steam valve. Then open the generator steam condensation valve. And, as the generator pressure is reduced, open gradually the valve in the bypass line between the anhydrous liquid line and the return gas line to the absorber. Keep remainder of system in operation until the generator pressure drops to 50 or 60 lb, then close the bypass line valve, and the valves in the return gas line from the evaporator to the absorber.

If there is insufficient expansion space in the evaporator, leave the valve open in the return gas line from the evaporator and watch the absorber pressure during the shut down period. If this rises to 70 lb, circulate water through the absorber to reduce the pressure.

To further reduce the generator pressure, temporarily connect cooling water to the generator steam condensation outlet, and open a union in the steam connection at the top of the generator to permit overflow of the water. Start water through the coil very gradually, to avoid contraction injury. Increase water flow as the liquid temperature drops. When the generator pressure becomes too low to cause flow of weak liquid to the absorber, stop the ammonia pump and close the generator weak liquid outlet valve. Stop the flow of water through the absorber and weak liquid cooler, but continue it through the generator until generator pressure reaches zero. Stop flow of water through the generator. If aqua must be removed from the generator, drain it through the drain valve by admitting air into the generator through the pressure gauge valve.

The absorber pressure may be reduced by closing the anhydrous liquid line stop valve and the return gas line from the evaporator. Keep the remainder of the system operating until the absorber pressure reaches a vacuum: If non-

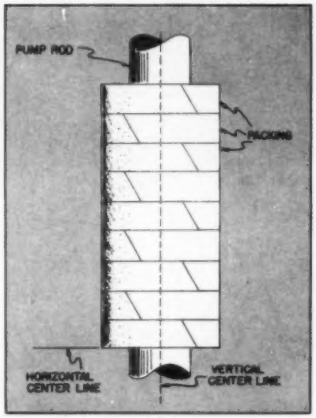

Fig. 4. Place packing rings on pump rod with the joints above the horizontal center on alternative sides. Do not place any joints below the center line

condensable gases prevent drop of absorber pressure more than a couple of pounds, close the generator weak liquid valve, and pump as much of the absorber contents into the generator as necessary to produce an absorber vacuum of 4 to 7 in. The remainder of the system can then be shut down as usual.

If necessary to remove the aqua ammonia, it can be pumped from the absorber into the generator, rectifier, condenser and receiver, if sufficient space is available.

The liquid may be returned to the absorber by opening the generator weak liquid valve, and, if necessary, raising sufficient generator pressure. When the liquid is at working level in the generator, close the weak liquid valve again and open gradually the valve in the bypass line, thus allowing generator gas pressure to force aqua from the rectifier, condenser and receiver into the absorber. When all the aqua has been returned to the absorber, close the bypass line and the system is ready to operate.

From time to time, the evaporator will require purging of part of its

(Continued on page 182)

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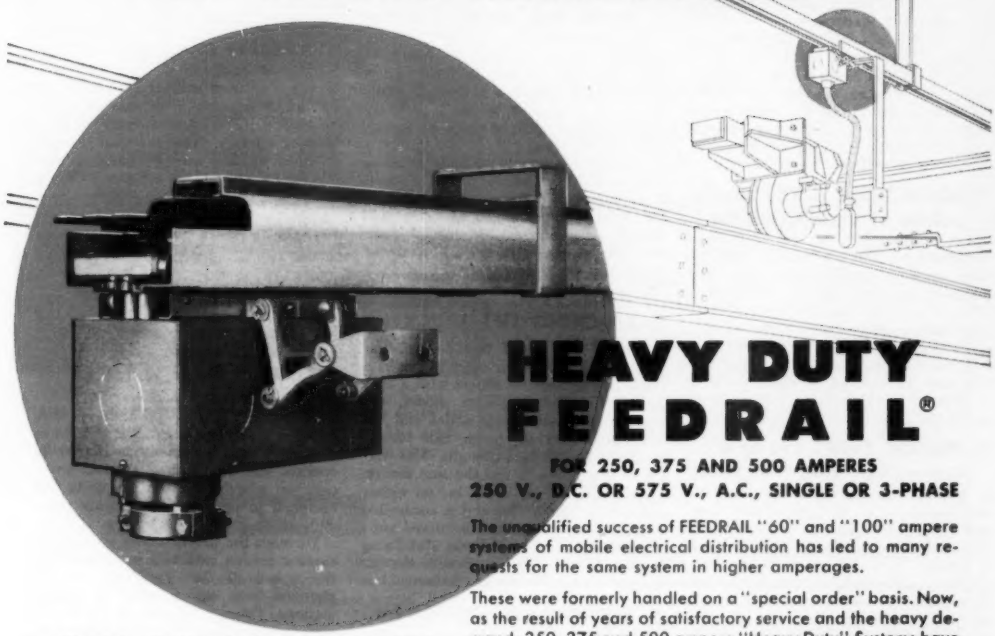

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NEW PRODUCTS summarized for your convenience

Edited by M. E. Heniken

Use the Reader Service Cards on pages 37-38 and 189-190 to ask for more information on these products. Circle item numbers of products in which you are interested.

1—VERTICAL DIP UNIT for use with cable conveyors

Described as especially applicable to plants concerned with military packaging, the Quick-Dip is said to step up the progressive stages of such packaging, involving washing, degreasing, rinsing, drying, finger-print removing, preheating, preservative dipping, drying.

Intended for use in conjunction with company's Universal cable conveyors, the Quick-Dip features a 9½ in. radius with the cable conveyor at a 60 deg incline. The design results in space saving tank dimensions and a reduction in the minimum amount of liquid the tank must contain for satisfactory results. (For more information on the Quick-Dip circle No. 1 on Reader Service Card.) The E. W. Buschman Co.

2—ADJUSTABLE FORKS handle pallets of various widths

Optional equipment for manufacturer's straddle-type electric tiering trucks, these new adjustable-base forks are designed for handling of pallets from 32 to 48 in. wide. Made of rugged steel sections, the forks are hinged to the main frame and adjusted manually by a screw arrangement. (Additional details may be secured by circling No. 2 on Reader Service Card.) The Raymond Corp.

3—PLASTIC TARPS are light, economical and washable

A number of desirable features are announced for the C Line of polyethylene industrial tarpaulins. Manufacturer says they weigh about 1/10 as much as many tarps of comparable size, they're waterproof and mildew-proof, transparent yet tough and tear-resistant, and pliable in all ranges of temperature. They won't absorb paint or liquids, it is said, and they're easily washed and dried. Cost of the plastic tarps is announced as about 1/3 that of other types. (To obtain information circle No. 3 on Reader Service Card.) Plastics Div., Canton Containers, Inc.

4—FLOATING THERMOMETER, metal, has easily-read dial

This floating thermometer, designed for reading without removal from tank or vat, was originally intended for use in processing cheese, but is finding application in other jobs where it is desirable to have a constant check on liquids during processing.

The thermometer is made of stainless steel and has an unbreakable window. It is supplied with a range of 50 to 150 F and stem length of 5 in., although other ranges and special types can be provided. (Details available—circle No. 4 on Reader Service Card.) Weston Electrical Instrument Corp.

5—STACKING LIFT TRUCK is built for side discharge

This Electric JackStacker will lift and stack any cylindrical object with a core hole. A 1100-lb capacity model will operate in 38½-in. wide aisles and the adjustable carriage boom can handle rolls of 53 to 88 in. in length. The lifting height is 8½ ft. and the side motion of the lifting arm is 31 in. on either side of the center line and is controlled from the handle head. Additional support is provided by celoron stabilizing casters. (Circle No. 5 on Reader Service Card.) Lewis-Shepard Products, Inc.

6—MICROWAVE SYSTEM for short haul applications

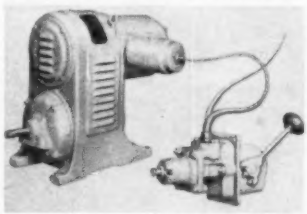
A simple, compact microwave radio system operating over a frequency range of 940 to 960 megacycles, which will provide low cost multiple channels for voice communication, telemetering, and remote supervisory and control functions is announced. This new relay equipment (Type RCA CW-5B) may be used for point-to-point communication over distances to 300 miles, using a chain of repeater stations. The equipment serves terminal and automatic relay stations, providing for simultaneous operation of five voice channels and one service channel. From nine to 18 telemetering, remote control or supervisory circuits may be substituted for each voice channel.

The CW-5B is designed for unattended operation, and may be installed at locations inaccessible for periods of several months. It may be used by oil, pipeline and gas companies, electric utilities, lumbering companies and other industries, manufacturer says, to replace existing wire or carrier-current systems and provide more dependable, flexible and economical service.

Transmitter and receiver may be installed in a single 84-in. cabinet or open rack for terminal installations. Connection to the antenna is by means of a solid or semi-flexible gas-filled coaxial cable. The system operates with single-sideband, suppressed-carrier type multiplex apparatus, similar to standard telephone carrier equipment. It is pointed out that no pulse synchronization is required and a single station failure doesn't disable the entire system. (Circle No. 6 on Reader Service Card for complete data.) RCA Victor Div., Radio Corp. of America.

7—PNEUMATIC CONTROL for variable speed motors

Variations in speed of this manufacturer's Varidrive motors by pneumatic control is possible with this new development. The control consists of a positioning unit, an air operated plunger attached to the Varidrive speed changing device and an air valve which remotely controls the positioning unit. Four types of valves are available, depending on the method desired to operate the mechanism: pedal, lever, cam or wheel. Positioning units are designed to operate with an air pressure of 60 or 100 psi.



Through the use of check valves and control station selectors in the system, the speed of the Varidrive can be changed from any number of control stations. Or, any number of Varidrives may be controlled by one station providing they operate at same speeds. (For more information circle No. 7 on Reader Service Card.) U. S. Electrical Motors, Inc.

8—THROWOVER PANEL transfers electric current

A control device, this new panel is designed to automatically transfer emergency lighting circuits, signal or communication systems, exit markers, regulating and metering equipment, fire protection apparatus to a standby power source when the regular supply is interrupted. Relative newcomers in the field of safety devices, throwover controls are legally mandatory for public buildings in some states.

This panel consists of mechanically interlocked normal-source and emergency-source contactors and a pilot contactor. Besides transferring circuits from a failed normal source to an emergency source and back again upon

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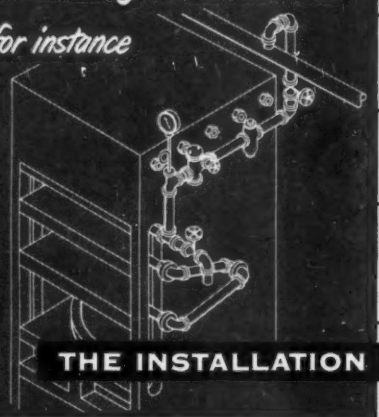
for instance



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AVAILABILITY:	Stock item in Crane Line

THE HISTORY

Steam generated at 130 psi is reduced through individual regulators on molding presses. Pressure used at machines is 60 to 100 psi depending on work. Features of regulator service needed most are: (1) non-fluctuating outlet pressure automatically maintained within close regulation; (2) easy adjustment by press operator to specified pressure for given work.

More than 25 years ago the plant standardized on Crane Regulators, a total of 225 being in use today. Many are the original installations, still delivering desired outlet pressure. Records for all regulators, regardless of age, show no maintenance cost other than prescribed simple routine servicing. On old models of the Crane 960 regulator, after prolonged service, this includes occasional regrinding of seats.

THE VALVE

Crane No. 960 Brass Pressure Regulators reduce steam or air pressures up to 250 psi, to within 80% of inlet pressure. Factory pre-set to operate within any of 4 ranges from 1 to 200 psi, with easily selected service pressure within set range. Precision made; fully automatic; highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for full data.

The Complete Crane Line Meets All Valve Needs. That's Why—

More Crane Valves Are Used Than Any Other Make!

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

For more facts circle 574 on Reply Card

NEW PRODUCTS

(Begins on page 128)

resumption of regular service, these contactors also control standby power equipment, such as an auxiliary generator, turning it on and off as required. (Circle No. 8 on Reader Service Card for data on this panel.) Control Department, General Electric Co.

9—SUMP PUMP is completely installed in the pit

This submersible sump pump has no protruding floats or rods and no extended pump shaft above the floor level, it is announced — the complete unit is installed in the sump pit. Motor and operating switch are enclosed in a stainless steel housing, which protects electrical parts and also functions as a float to control pump operation. If the electrical power should fail, the housing allows the pump to be completely submerged without damage to the motor, manufacturer points out.

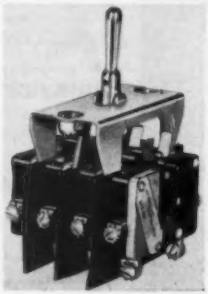
The pump is described as low in cost and easily installed by connecting discharge piping and plugging in the electric cord. The operating range is factory-set, no float adjustment is needed. (For data circle No. 9 on Reader Service Card.) Fairbanks, Morse & Co.

10—STOKER offers smokeless operation on light loads

This relatively small spreader stoker is announced as offering continuous cleaning benefits for small and medium sized units from approximately 100 rated boiler hp to 75,000 lb of steam per hour. The continuous cleaning feature of this new Type CC Rotostoker is provided by a reciprocating grate, the alternating sections of which are fixed. Proper agitation of fuel bed keeps it porous and at the same time avoids blow-holes or dead spots. Ample furnace turbulence is provided by a combination over-fire air and cinder return system. (Circle No. 10 on Reader Service Card for data.) Detroit Stoker Co.

12—TOGGLE SWITCHES for multiple circuit control

Although built primarily to meet exacting vibration resistant requirements of aircraft, these assemblies are said to find use in any electrical equipment where manual or mechanical multiple circuit control is required. Assemblies are available with from one to 10 double-throw switching elements, all operated by a single lever, which may be detented in the center, and either



or both extreme positions, or may be self-returning to the center.

Each switching element is Underwriters' Laboratories listed at 10 amp up to 250 v a-c, and will handle 30 v d-c inductive loads at sea level. (To get Form A84-32 covering these assemblies, circle No. 12 on Reader Service Card.) Micro Div., Minneapolis-Honeywell Regulator Co.

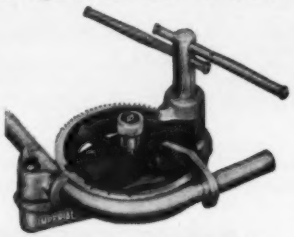
13—FLUSH HANDRAIL, easy to install and maintain

Besides having a flush surface and porcelain enamel finish, this new handrail is designed with concealed internal bolt fastenings for installation with a minimum of tools and no on-the-job welding. It is prefit, company points out, so there is no possibility of threads being exposed to corrosion after assembly. This handrail can be provided to plant's requirements as to shape, span, etc. (For details circle No. 13 on Reader Service Card.) Seaporcel Metals, Inc.

The new Reader Service Cards on pages 37-38 and 189-190 are postage-free and easy to use. Just circle the item number of any product you are interested in.

14—TUBE BENDER is gear-type, highly compact unit

This universal tube bender, the No. 270-F, will bend any type of tubing including hard drawn copper and hard temper steel, it is announced. The bender is so constructed that it can be positioned on the tube at any point where a bend is desired, thus bends can be made even when one end of the tube is connected. It can be used for right or left hand bends, return



bends, offset and right angle bends.

The high gear ratio makes bending easier, manufacturer states, an advantage when working with hard temper tubing or large size tubing. A separate bender is used for each size of tubing. (Circle No. 14 on Reader Service Card to get Bulletin 3005 describing this gear-type bender.) The Imperial Brass Manufacturing Co.

11—HOIST features "walk-throughs"

Rated at 1200-lb capacity, the Model K Roll-O-Hoist is designed to accommodate a standard two-wheel concrete buggy, or can be furnished with a tipover bucket for handling ¼ yd of concrete. Crossbraces—adjustable every 2 ft—permit a 6-ft walk-through opening at any loading level on the hoist, letting workmen roll buggies directly through the hoist frame.

The Model K consists of a vertical all-steel frame mounted on two pneumatic rubber tires and equipped with a 47 by 57 in. platform. Power is supplied by a 7½ hp gasoline winch or 3 hp electric motor. A remote control mechanism lets a single operator govern both the motor switch or engine throttle and the positive acting mechanical brake from any position on the hoist. (Circle No. 11 on Reader Service Card for further information.) Construction Machinery Sales Co.

15—LIFT TRUCK is economical, hydraulic-electric unit

Designed for 1000-lb capacity loads, the Model 1000-E is manually propelled and suited to a wide range of light and medium handling jobs. Its electric lift is actuated by a piston-type hydraulic pump, powered by a 6 v electric motor. Current is supplied by an automotive-type storage battery equipped with a charger for over-night charging.

Suggested for use wherever "material-plus-handling" costs can be reduced, the 1000-E will raise — by finger-tip electric control — a full capacity load from floor to 4 ft in 15 sec, company states. (For further details on this lift truck circle No. 15 on Readers Service Card.) Century Products Co.

(Continued on page 154)

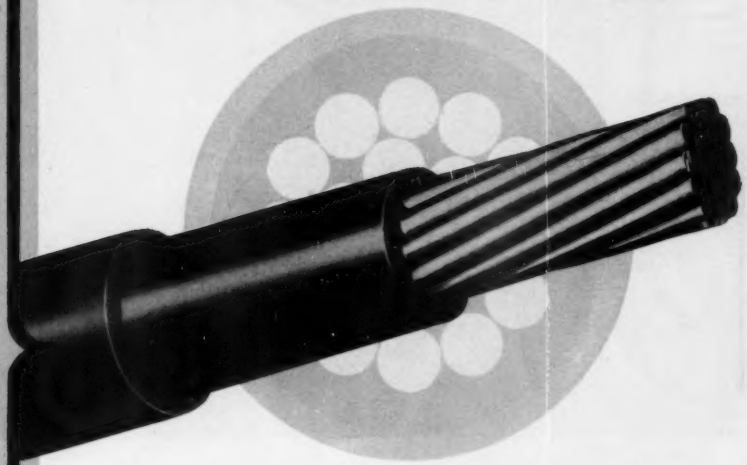
REDUCES INVENTORY

SAVES TIME

SAVES MONEY

RoMarine - RoPrene®

All-Purpose Power Cable



RoMarine-RoPrene offers a way to reduce inventory because of its versatility and its adaptability to many uses . . . *one cable type for a variety of applications installed direct in earth, in ducts, on racks or aerially.* Standardizing on RoMarine-RoPrene conserves scarce copper, eliminates expensive and heavy to handle lead sheath. It is the modern all-purpose power cable.

That is only one reason why you should specify RoMarine-RoPrene. The other is its dependable high quality.

RoMarine-RoPrene is a combination of RoMarine . . . a specially compounded rubber insulation, highly resistant to moisture and heat, and RoPrene . . . a durable Neoprene sheath resistant to flame, moisture, oils, soil acids and alkalies, abrasion and weather. Designed for an operating temperature of 75° C., RoMarine-RoPrene is available for services up to 5000 volts. It is highly recommended for secondary network circuits, underground entrances, street lighting, station control circuits and industrial power systems.

RoMarine-RoPrene is but one in a wide variety of wires and cables offered by Rome Cable to meet virtually every electrical wiring need. All can be manufactured to your specific requirements. Get further information and technical data on Rome's extensive line of power and control cables today. Sign and mail the coupon.

Underwriters' approved as Type USE. Accepted by leading utilities and industrials. CAA approved for airport lighting under Specification L-824.

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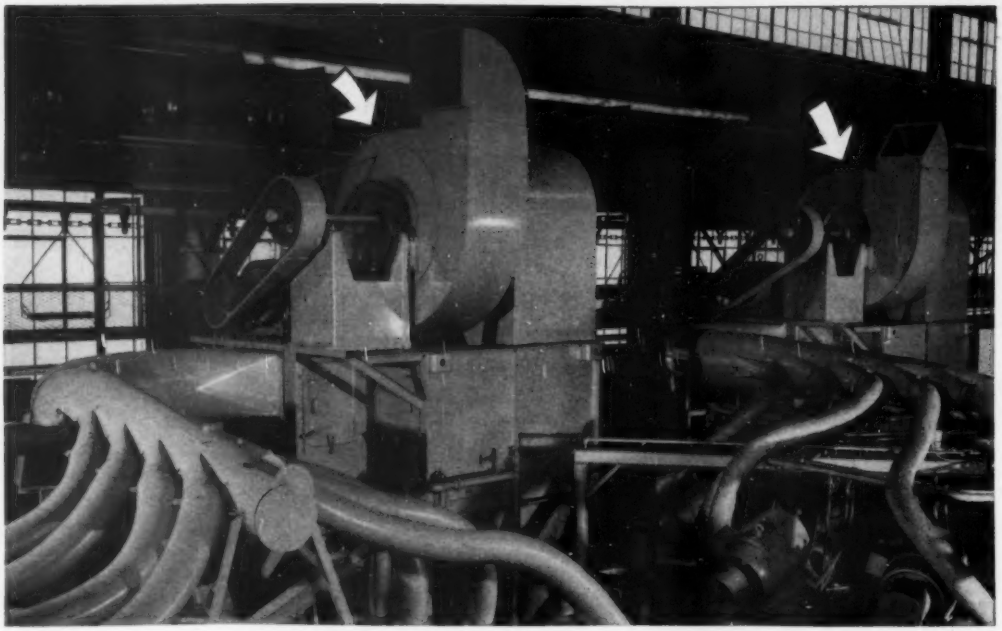


Another Clarage Installation in One of America's 97* Largest Industrial Enterprises

***97**

OF AMERICA'S 100 LARGEST CORPORATIONS

are users of Clarage equipment . . . This wide acceptance denotes the high quality and reliable performance of Clarage products.

Above you see two of the twelve Clarage Improved Exhausters on a vital-to-production dust collecting job in the Monroe, Michigan plant of the Ford Motor Company.

These twelve fans operate in connection with twelve American Air Filter Company's Roto-Clone installations.

Ford Motor Company has used Clarage equipment for over a quarter century.

Counting all of this Company's plants, well over a thousand Clarage fans are now handling the many and varied air handling requirements of this leading automotive and defense materiel manufacturer.

You can RELY on Clarage equipment to give you economical service for a long time to come. CLARAGE FAN COMPANY, 611 Porter Street, Kalamazoo, Michigan.

You can Rely on...

CLARAGE

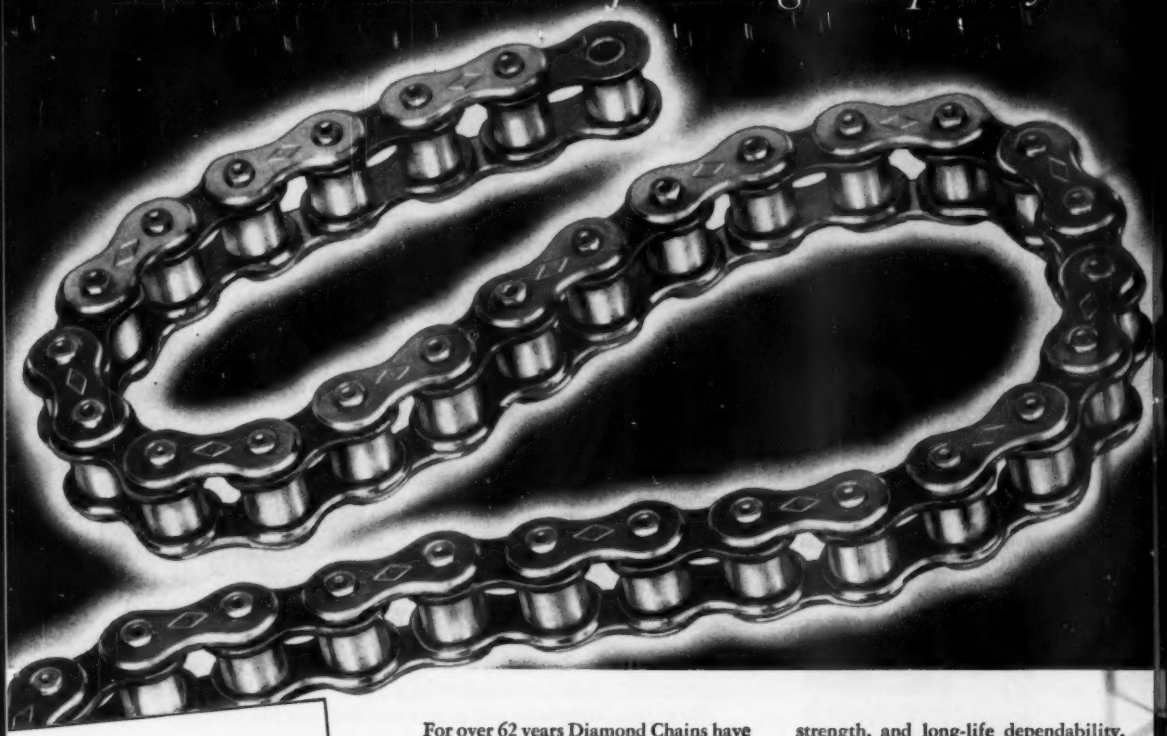
Headquarters for Air Handling and Conditioning Equipment

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

For more facts circle 576 on Reply Card

DIAMOND

ROLLER CHAINS *of the highest quality*



An Important Diamond Advantage—
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Maximum rigidity of links insured by special pitch hole preparation for 100% effective bearing area of pin and bushing. Longer life, smoother operation.

For over 62 years Diamond Chains have demonstrated their many advantages in services of every kind and description. Proven performance is responsible for the high level position Diamond has been accorded.

Diamond Roller Chains are in such wide use because of their long record of strict uniformity of quality, smooth and quiet operation, great reserve strength, and long-life dependability. To many experienced production men, engineers and machinery designers, *Diamond* means Roller Chains of highest quality.

DIAMOND CHAIN COMPANY, Inc.
Dept. 614, 402 Kentucky Ave.,
Indianapolis 7, Ind.

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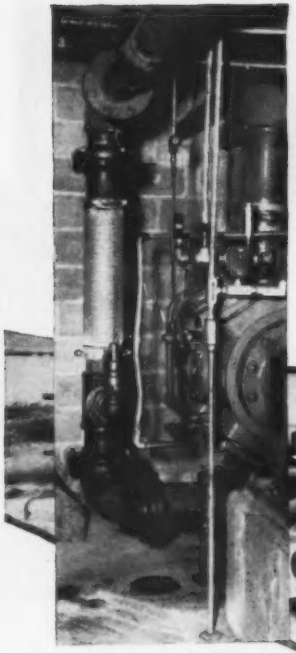
Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

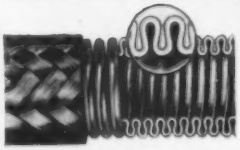
DIAMOND **ROLLER CHAINS**

Here's the

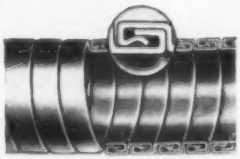
ECONOMICAL WAY

to keep vibration out of rigid piping . . .





CMH corrugated steel and bronze hose is available in standard sizes from 3/16" through 14" I.D. for burst pressures to 12,000 psi, temperatures to 1000° F. Stainless steel types also available.



CMH convoluted hose is available for lower pressure applications in a variety of types including square locked, ball bearing and fully interlocked . . . in steel, bronze and other alloys. Sizes up to 12" I.D.

CMH FLEXIBLE METAL HOSE

Isolation of vibration is easy and economical when you use CMH Metal Hose to connect rigid piping to machinery. Metal hose assemblies are quickly installed, just like a length of pipe. The flexibility of the unit effectively absorbs vibration while the all-metal construction assures long, dependable service. If you have a vibration problem in your piping it will pay you to consider CMH Flexible Metal Hose. Your Flexonics distributor can give you full information. Look for his name in your classified telephone directory.

CHICAGO METAL HOSE Division

Flexonics *Corporation*

1340 S. Third Avenue • Maywood, Illinois

Manufacturers of Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals • Expansion Joints for Piping Systems • Stainless Steel and Brass Bellows • Flexible Metal Conduit and Armor • Assemblies of These Components

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Flexon identifies CMH products that have served industry for over 50 years.

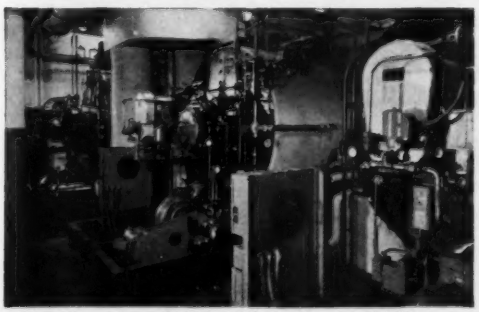
CMH

For more facts circle 578 on Reply Card

SEE
Cleaver-Brooks Exhibit
20th National Power Show
New York — December 1-6
Booth 7-W

WASHINGTON POST BUILDING, Washington, D. C. Albert Kahn Associated Architects and Engineers, Inc. John McShain, Inc. — General Contractor. Standard Engineering Company, Engineers and Contractors.

THE WASHINGTON POST'S new 7-story building is heated by a combination of a hot blast ventilating system for the inside areas and convector radiation along the outside walls. The steam distribution system is divided into two sections, one supplying the fan blast coils at 3 lbs. to 5 lbs. pressure and one supplying the radiation at 3 lbs. to 5 lbs. pressure.



Three Cleaver-Brooks 150 hp., oil-fired, self-contained boilers were easily and quickly installed in low headroom, basement space.

Three Cleaver-Brooks 150 hp. oil-fired, self-contained boilers, installed in the basement location, supply steam for the entire heating system.

Modern Cleaver-Brooks boilers are increasingly specified for heating service. Completely self-contained and compact in design, requiring minimum headroom and floor area, Cleaver-Brooks boilers offer many installation and operating advantages — oil, gas, or combination oil and gas firing — fully automatic — clean — dependable performance — operate at a guaranteed efficiency of 80%. Available in sizes from 15 to 500 hp., 15 to 250 psi.

Write for the latest, fully illustrated Steam Boiler Catalog — Cleaver-Brooks Company, Dept. M, 306 East Keefe Avenue, Milwaukee 12, Wisconsin, U.S.A. *Cable address:* CLEBRO-Milwaukeewis.

Cleaver-Brooks
Originators of Self-Contained
STEAM BOILERS

Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners

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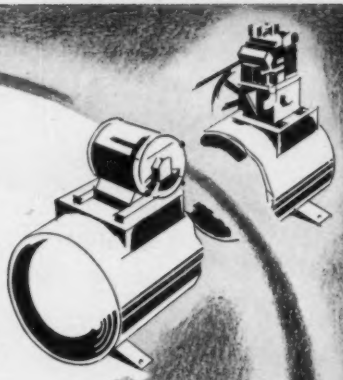
DON'T BUY HALF A COMPRESSOR!



GET FULL-RATED GUARANTEED OUTPUT WITH WAYNE

When you buy a Wayne two-stage Air Compressor, you are *guaranteed* an actual usable air output to meet your individual job requirements not just a theoretical displacement rating. An exclusive flow meter test at the Wayne Plant makes certain every Wayne two-stage Compressor is checked for proper volumetric efficiency, and uninterrupted performance — *guaranteed* to the user.

Wayne Compressor construction features include such outstanding advantages as larger flywheel — more cooling capacity; dual intake valves; dual moisture extractors; improved lubrication system; automotive type pistons, and other refinements to give you top performance and long-lasting service.

Next time you buy a compressor, don't buy half a compressor, buy Wayne and get full-rated, *guaranteed* air output to meet your job requirements. Every Wayne Compressor is backed by a nation-wide service organization.

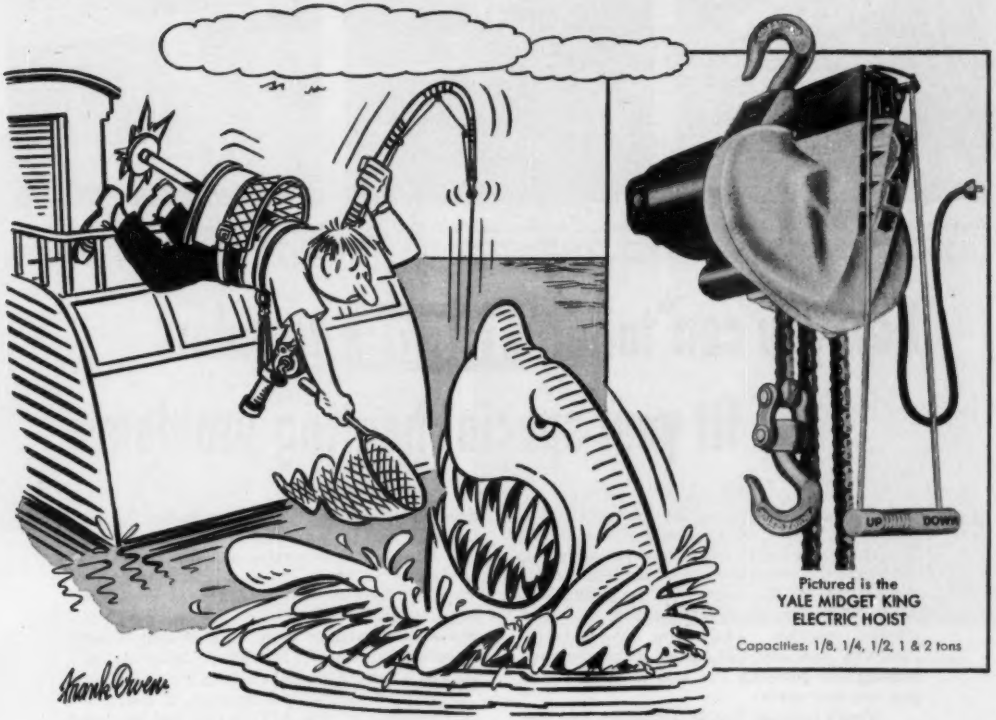
THE WAYNE PUMP COMPANY

SALISBURY, MARYLAND • TORONTO, CANADA

Wayne

For more facts circle 580 on Reply Card

There's a YALE hoist for every lifting job!



Pictured is the
YALE MIDGET KING
ELECTRIC HOIST
Capacities: 1/8, 1/4, 1/2, 1 & 2 tons

Modern industry is based on the speedy, economical, mechanical movement of materials! Because, without this ready flow, costs would be higher . . . efficiencies lower! That's why more and more YALE Midget King Electric Hoists are being used in the plants, factories and warehouses of all industries . . . everywhere. The improved *load brake* is automatic, self-acting . . . the powerful *motor brake* is totally enclosed for longer, more trouble-free life.

The hoist itself is equipped with upper and lower limit safety stops, safety load hook, Tru-Guide chain stripper, precision ball-bearings, alloy-steel roller chain, one-hand operating controls and many more YALE-engineered features. But, get the full story . . . contact your YALE Distributor . . . he's listed in the classified phone directory and is the *only* source of these cost-cutting work-saving hoists and allied YALE hoisting equipment.

YALE is a Registered Trade Mark of The Yale & Towne Mfg. Co.

Yale Gas and Electric Industrial Trucks • Yale Worksavers
Yale Hand Trucks • Yale Hand and Electric Hoists • Yale Pul-Lifts

YALE HOISTS

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

MAIL THIS COUPON TODAY

The YALE & TOWNE Mfg. Co., Dept. 4711
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I'm interested in lifting for less with a YALE Hoist.

Please send detailed literature on:
☐ YALE Hand Hoists. ☐ YALE Electric Hoists.

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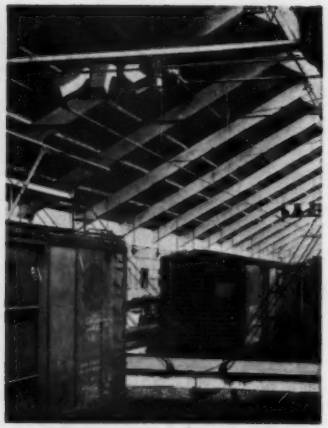
In Canada write: The Yale & Towne Manufacturing Co.
Box 337 — Postal Station "A" — Toronto

For more facts circle 581 on Reply Card

Fresh Air is introduced through the saw-tooth. Torridor warms this air quickly and delivers it through ductwork.

Employees Stay Warm and draft-free in this production area, warmed by Torridor inverted ceiling type unit.



Torridors Kill Drafts at the doors to this covered track, get warmth right down to the loading dock.

How you can "tailor" TRANE torridors to fit your special heating problems

THINK of a *tough* heating job—where you need a big volume of warmed air. Then take a TRANE Torridor with the needed fan capacity. Add to it the exact amount of heating surface the job calls for, the motor with the right horsepower, the most economical drive, the most efficient controls. Result: you have actually "tailored" this one unit heater to handle your heating job perfectly . . . and it doesn't cost you one cent extra!

That's because TRANE Torridors give you an *unmatched choice* of component parts. You can select from 5 basic models, 10 cabinet sizes and a wide range of motors, filters, controls, dampers and heating coils. Motor or direct drive; 2, 3 or 4 outlets. Thus you can specify the *exact* unit for your job.

And this blower-type unit works almost anywhere. It heats big spaces like assembly areas. It delivers heat to order. It pinpoints large volumes of heat for process work. It works either with or without ductwork. It can introduce outside air, if desired—tempered by famous TRANE Kinetic Orifice coils.

This versatility and freedom of choice is characteristic of the full TRANE line of unit heaters. *Six different types* for every unit heater job. Prompt delivery on current orders. See your nearest TRANE sales engineer or write for Bulletin DS-327A.

TRANE Projection Heater with Louver Cone Diffuser gives 60% greater heat-throw.

TRANE Model H Unit Heater with Louver Fin Diffuser does the work of *two* units.

TRANE Float Trap (shown), Bucket and Thermostatic Traps give perfect results with TRANE Unit Heaters.

TRANE

THE TRANE COMPANY, LA CROSSE, WIS.
Eastern Mfg. Division, Scranton, Pa.
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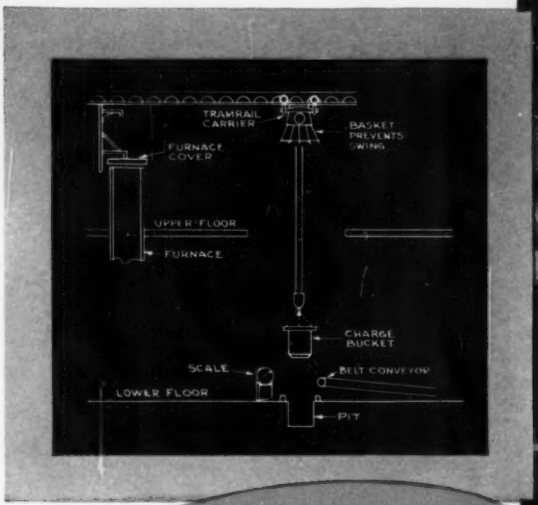
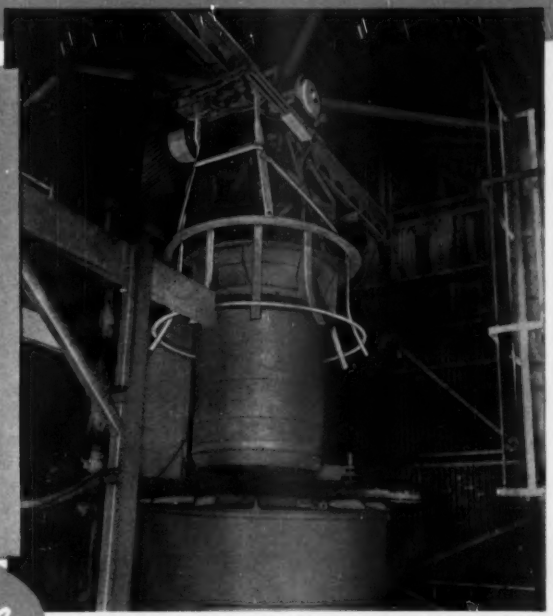
MANUFACTURING ENGINEERS OF HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

For more facts circle 582 on Reply Card

CLEVELAND TRAMRAIL

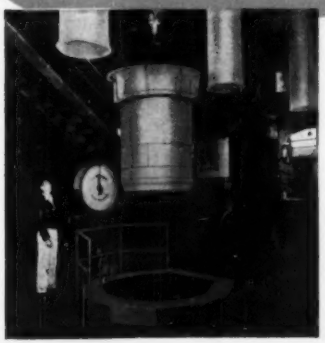
THE OVERHEAD TRACK TO
Lower Production Costs





Carrier over furnace. As soon as it stops, bucket begins descent into furnace. Even furnace cover is swung away automatically by carrier bumper.

MELTING FURNACE *Charged Automatically*



Charge bucket leaving scale to begin trip to furnace. Materials are fed into bucket by belt conveyor, while bucket is on scale in floor pit.

BUCKETS loaded with 2000 lbs. of charge materials consisting mostly of old battery plates are delivered from weighing scale to melting furnace, emptied and returned automatically by means of a Cleveland Tramrail Automatic Dispatch System. When a bucket is filled by a belt conveyor, pressing a push button sets the hoist and all succeeding movements in operation. After the bucket has reached high position and is firmly nested in the steel swing-prevention basket, the Tramrail carrier travels to the furnace. The bucket lowers into the furnace and is emptied. It then returns to the starting point and the cycle is repeated. The entire furnace-charging job is taken care of by a single man at the scale. This simple, easy method of furnace-charging is one example of the variety of ways Cleveland Tramrail Automatic Dispatch Systems are aiding many companies in different fields to raise plant efficiency, cut costs and improve safety.

GET THIS BOOK—Write for a free copy of Book 2008. Packed with valuable information, this well-illustrated book starts you thinking of ways you can step up production and lower costs in your plant

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7597 EAST 284th ST. WICKLIFFE, OHIO

CLEVELAND TRAMRAIL

THE OVERHEAD TRACK TO
Lower Production Costs

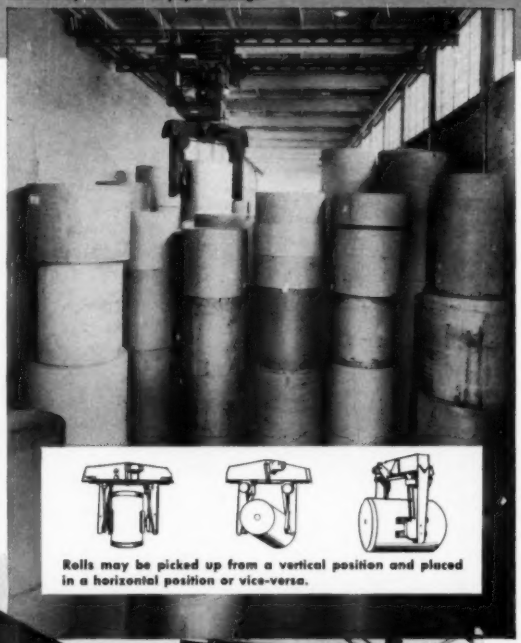
HANDLES COILS, REELS or ROLLS *Vertically and Horizontally*

EQUIPMENT especially developed for handling coils, reels or rolls on Cleveland Tramrail overhead track systems, with vertical-horizontal power-turn feature, offers you many advantages:

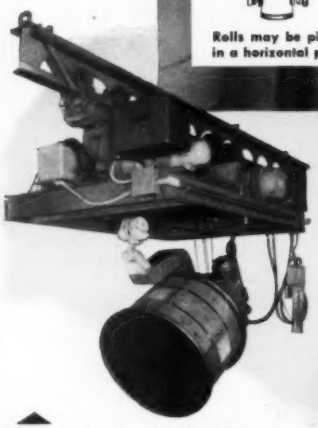
1. Permit full utilization of warehouse floor area for storage—no aisleways necessary.
2. Enable high piling—sometimes 40 feet and more.
3. As a result, warehouse capacity can often be increased from 50% to 150%.
4. Cost of building for amount stored is lowest possible. Building height can be increased at a fraction of the cost for enlarging floor area to obtain equivalent cubic storage space.
5. Handling materials in or out of storage is speeded because they are readily accessible without need of moving other materials.
6. Deliveries can be made directly to warehouse from incoming conveyance, or from warehouse to point of manufacture, on Tramrail carrier with no time-consuming, in-between handling.
7. Safety is improved because workers are usually removed from the load and heavy manual lifting and moving are eliminated.
8. Drastically cuts handling and storage costs.

Regardless of what materials must be handled in your plant, whether steel, copper, paper, cloth, etc., most likely a proper Cleveland Tramrail installation will prove of tremendous help to you as it has for thousands of other users. A nearby Cleveland Tramrail representative will be glad to go into the details.

6000 lb. rolls of paper are easily handled in any position with the Cleveland Tramrail motorized roll grab. One warehouse has piles to 42 feet high. Some users save 1% of all paper handled by reduction of paper damage.



Rolls may be picked up from a vertical position and placed in a horizontal position or vice-versa.



5000-lb. reels of copper wire, 26" wide by 40" dia. with 5" dia. core, are handled with this unit which turns from horizontal to vertical position.

10 coils of rod weighing 330 lbs. each are picked up at a time from horizontal position and placed in vertical storage to heights of 20 or 30 ft. with this unique grab and Tramrail carrier. No aisleways. One operator in crane cab does entire handling job.

GET THIS BOOK—Write for a free copy of Book 2008. Packed with valuable information, this well-illustrated book starts you thinking of ways you can step up production and lower costs in your plant

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
7597 EAST 284th ST. WICKLIFFE, OHIO

here's why

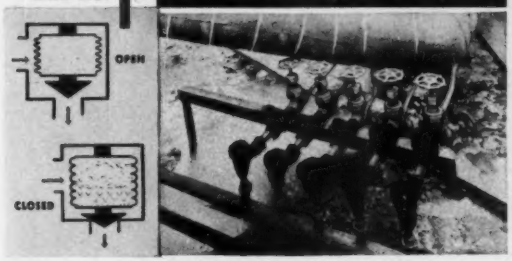
they selected 4 different types of steam traps for 4 different applications

CONDITIONS under which steam traps must operate vary widely, but there is for every service one type that gives maximum efficiency.

Sarco makes the 4 distinctly different TYPES of steam traps shown below. Therefore, Sarco can give you *impartial* advice on the best choice for your particular installation.

For each of the 4 jobs listed below, the users selected four different TYPES of Sarco traps.

CASE NO. 1 — Draining outside tracer lines in an oil refinery in New Jersey



Type of traps installed: Sarco No. 9 thermostatic traps.

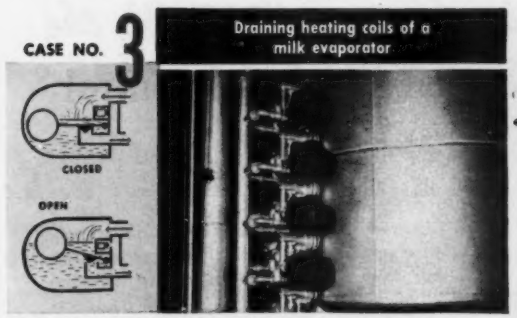
Why selected: Being thermostatic, they are steam misers. Can't freeze, being wide open when cold. Easy to maintain since only the bellows moves. Small, light and easy to install. Self-adjusting for different pressures.

CASE NO. 2 — Draining platens of compression plastic presses

Type of traps installed: 100 Sarco Inverted Bucket traps in service for 17 years.

Why selected: Press platens have small horizontal steam spaces; the intermittent blast discharge of these Sarco traps scours the heating surface. Built-in strainer cuts maintenance costs.

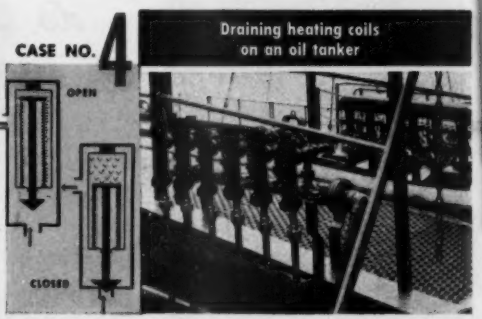
CASE NO. 3 — Draining heating coils of a milk evaporator



Type of trap installed: Sarco Float-Thermostatic Trap.

Why selected: Heating surfaces of the coils must be kept full of live steam — this Sarco trap discharges condensate as it collects. Can't airbind because the integral thermostatic vent gets rid of air, regardless of operating steam pressure and temperature. As shown in sketch 3 above, this vent does *not* depend upon the discharge of condensate.

CASE NO. 4 — Draining heating coils on an oil tanker



Type of traps installed: Sarco LIQUID EXPANSION traps No. 871.

Why selected: Traps on tankers are exposed to freezing weather and vibration. Sarco's No. 871 traps can't freeze; resist vibration, water-hammer, pressure pulsations and superheat. These traps discharge condensate at adjustable temperatures below 212°F., permitting use of some of the condensate's sensible heat.

● Write today for Bulletin No. 145-A: *Selecting the Right TYPE Steam Trap.* Sarco Company, Inc., Empire State Bldg., New York 1, N. Y. Represented in principal cities. Sarco Canada Ltd., Toronto 8, Ontario.

408

SARCO saves steam

improves product quality and output

For more facts circle 584 on Reply Card

LEONARD CARPENTER OF CURTIS HOTEL SUBMITS WINNING IDEA

Leonard Carpenter, chief engineer of the Curtis Hotel in Minneapolis, tells us how he has set up a remote control for a steam valve located far from the boiler room. This labor-saving innovation won Mr. Carpenter an award in the Honeywell Industrial Control Idea Derby.

The problem was one of cutting down travel. In the basement of the hotel is the boiler room where exhaust steam from the power plant is used to heat the building. Twelve stories up, on top of the roof, is the pressure valve for the heating mains. Every time the steam mains needed a change of pressure, a man had to go all the way from the boiler room to the roof, to adjust weights on the butterfly valve. Often these changes had to be made several times a day.

Carpenter worked out an efficient solution. He installed a Honeywell *Modutrol* motor on the valve up on the roof. Then he connected the motor to a Honeywell *Pressuretrol* located in the boiler room. Now, he can get any pressure he wants simply by setting the *Pressuretrol*. Nobody has to leave the boiler room to set the valve. Adjustments are made instantly, without the time lag of twelve-story trips.

Honeywell *Pressuretrol* Unit

NEW NEWSPAPER HELPS PLANT ENGINEERS

Honeywell's Industrial Division now issues a periodic publication—*Industrial Control News*—which contains detailed information on many new and unusual applications for automatic controls throughout industry. In its pages, production and maintenance men tell how they are reducing costs and increasing operating efficiency on all types of equipment. According to a release from the company, anyone interested in industrial controls can contribute to *Industrial Control News* . . . and can receive copies . . . by sending name, company, title and address to MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Station 40, 4491 Wayne Ave., Philadelphia 44, Pa.

do you have an "IDEA" for the

Honeywell Industrial Control

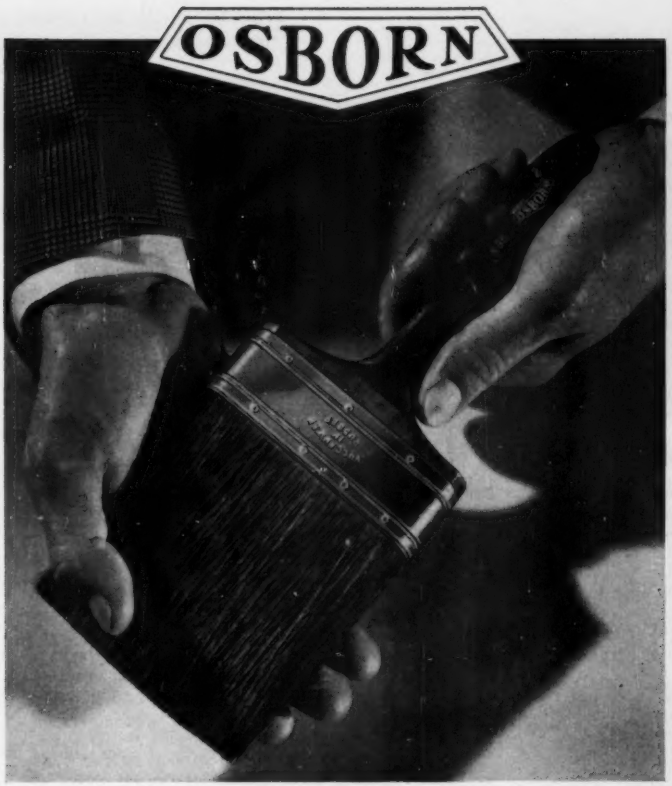
IDEA DERBY?

Just send us a sketch and description of how a non-indicating control is now being used to help keep things running smoothly in your plant. Think about it! Then send it in! An impartial board of judges will rate it in terms of its importance to the maintenance of plant operations. You may win a Honeywell Electric Clock Thermostat or one of the other special awards. All material submitted becomes the property of MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4491 Wayne Ave., Philadelphia 44, Pa.

Win a
HONEYWELL ELECTRIC CLOCK THERMOSTAT

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

For more facts circle 585 on Reply Card

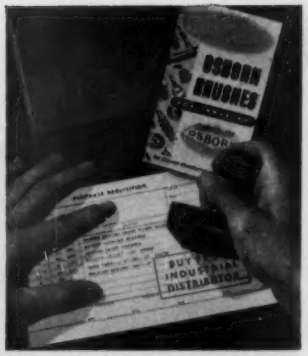


Why shop around? Just specify "OSBORN"

YOU KNOW OSBORN Brushes are good. To simplify buying and to assure getting unsurpassed quality, all you need to do is *specify* "OSBORN". No need for shopping around. No chance for questionable quality. You can buy OSBORN paint, maintenance and power brushes with confidence because their workmanship and materials are backed by 60 years of OSBORN service to Industry. Order them automatically from your INDUSTRIAL DISTRIBUTOR on the same order as other mill supplies. *The Osborn Manufacturing Company, Dept. 875, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



IT'S SIMPLE. You can make one order cover OSBORN brushes and other leading-brand mill supplies when you buy from your Industrial Distributor. This standard practice streamlines your purchasing, cuts your supplies inventory, assures you good service on top quality products.

HANDY STOCK. Your Industrial Distributor carries a large stock of OSBORN brushes to supply you with the right type of brush promptly. Saves your time. The OSBORN Master* Sweep Floor Brush shown is a nationally recognized product.

FOR YOUR NEEDS. There is a complete line of Osborn power brushes to meet your cleaning and finishing problems. Built for Industry by the Company that knows Industry's problems. They do their jobs thoroughly and fast. *Trade-mark.

For more facts circle 586 on Reply Card

Traveling Arbor Carriage Holds Gears for Blast Cleaning

Cleaning and peening of rough forged gears is economically done at the Fairfield Manufacturing Co., Lafayette, Indiana, with a modified airless blasting machine.

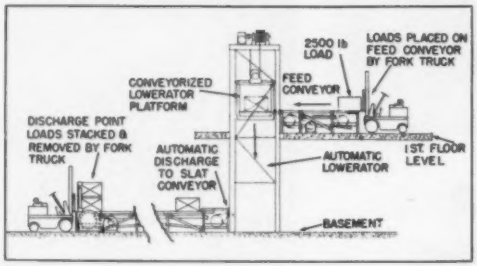
The addition of a specially designed traveling carriage permits the cleaning of worm, spur and helical gears. The gears are mounted on an arbor spinner fixture in the traveling carriage, and the carriage travels into the blast zone. After a predetermined blast time, the carriage automatically returns to the work station, where the gears are removed from the arbor.

As designed for use on an American Wheelabrator & Equipment Corp. blasting machine, the arbor carriage can accommodate gears up to 15 in. in diameter.

Automatic Lowerator for Inter-Floor Handling of Tinplate Bundles

Incoming tinplate is received at the Continental Can Company, Baltimore, Md. in such quantities that highway trucks from nearby steel mills unload continually. Until recently, the tinplate was hauled 140 ft by fork truck to an elevator which lowered it to the basement. It took 30 minutes to unload a highway truck and tinplate piled up at the elevator.

To speed unloading operations and eliminate congestion, an automatic conveyor-lowerator system was installed. The system, engineered, manufactured, and installed by the Gifford-Wood Co., Hudson, N. Y., frees the elevator, eliminates the long fork truck haul, and enables highway trucks to be unloaded in 10 minutes.


2500 lb LOAD
LOADS PLACED ON FEED CONVEYOR BY FORK TRUCK
CONVEYORIZED LOWERATOR PLATFORM
FEED CONVEYOR
DISCHARGE POINT LOADS STACKED & REMOVED BY FORK TRUCK
AUTOMATIC DISCHARGE TO SLAT CONVEYOR
AUTOMATIC LOWERATOR
1ST FLOOR LEVEL
BASEMENT

The system is completely automatic and is controlled by electric eyes and limit switches. When a fork truck unloads a bundle of tinplate onto the first floor conveyor, the conveyor automatically delivers it to the live-roll platform of the lowerator. The lowerator descends to the basement and automatically discharges the bundle to the basement conveyor from which it is taken to storage by a second fork truck. Controls are interlocked so that any given section of the system will not operate unless the next section is ready to receive a bundle. The first floor conveyor is located close to the unloading dock to reduce unloading truck travel.

This system, with modifications, can be used for interfloor handling of boxes, barrels, bags, crates, drums, carboys, etc., of virtually any type material. It also can be designed to operate in either or both directions.

Insulation Combination Insures Low Heat Loss in Boiler Settings

To insure low heat loss through boiler settings and long insulating life at high temperatures, engineers at the Riley Stoker Corp. specify a combination of mineral wool blocks and mineral wool felts for steel-clad insulated casings on steam-generating units, according to Industrial Mineral Wool Institute.

In the photograph, insulation is being applied to the furnace water-well section of one of the two 50,000 lb/hr units at the new Toms River, N. J., plant of Ciba States Limited. Although the specified insulation thicknesses vary with operating temperature, the sequence of application at Toms River represents good practice in the insulation of steel-clad boilers of all sizes in every branch of industry.

From left to right, the 3¼-in. water-wall tubes (on 5-in. centers) are covered with T-tile secured with high-temperature air-setting cement. Two-inch-thick mineral wool blocks, 12 by 18 in., are stacked against the tile with all edges staggered. Then, 24 by 24 in. mineral wool felts, 3½-in. thick, are placed over the boards. To secure both layers of insulation permanently in place, the felts are compressed about ¼-in. when the 10-gage steel casing is installed.

These 2 generating units supply all process steam and heating for 3 large chemical process buildings and a number of service buildings. Ciba States uses the process steam for heating reaction vessels, solvent recovery distillations and dryers in the production of organic dyes, intermediates and other chemicals.

Heavy Rigging and Tight Quarters Feature Drum Installation

Structural steel, rigging and outsized wire rope slings played important roles in the erection of a 240,000 lb drum, 50 ft in length, for a Combustion Engineering-Superheater, Inc., steam generating unit being installed at the Joppa Steam Station of Electric Energy, Inc., Joppa, Illinois. This drum has an outside diameter of 70 in. and one of its sections was rolled from steel plate having an initial thickness of 6 3/32 in. These steam generating units, six in number, are intended to furnish power for an Atomic Energy Commission project located near Paducah, Kentucky. They each have a maximum continuous rating of 1,200,000 lb per hour of primary steam at 1925 psig and 1055 F, and 1,110,000 lb of reheat steam at 489 psig and 1005 F. The steam generating plant is of semi-outdoor construction.

Winch and Booms Add Versatility to Fork Truck Operation

At their Chicago plant, the Quaker Oats Company has simplified its heavy machinery moving problems with the use of a versatile fork truck. An 8,000-lb capacity Yale fork truck is equipped with a die-handling winch attachment, mounted on the truck's upright channels, and two gooseneck booms that can be interchanged with the forks. Using this winch, the truck can pull machinery directly onto the forks; or, using the gooseneck booms, it can lift and transport unwieldy machinery.

The fork carriage permits the use of either one or two booms—with one or both of them rated for a maximum capacity of 6,000 lb at 36 in. outreach, 5,000 lb at the 48 in. maximum outreach, and with both booms, 8,000 lb at 24 in. outreach.

The booms and forks can be changed in 5 minutes.

Glass Insulation "Keeps It Quiet" for Alcoa Building Tenants

When Aluminum Company of America's new 30-story skyscraper in Pittsburgh is completed this year, it will boast many new "firsts" in engineering, design and use of new materials. Not the least of the "firsts" is the initial large-scale use of glass fiber insulation for acoustical purposes. The material used is Ultralite, produced by the Gustin-Bacon Manufacturing Co., of Kansas City, Mo.

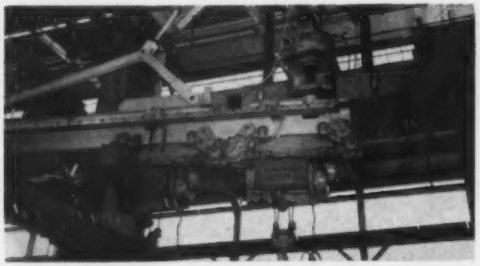
In the Alcoa building, 250,000 sq ft of this material was used to soundproof the ceilings and the insides of air ducts. Faced on one side with a vinyl spray coating, it was used in the ceilings at a weight of only two pounds per cubic foot. A slightly heavier glass fiber insulation was used to deaden fan noises and other sounds carried through the duct system.

Besides being soundproofed, the Alcoa Building ceilings have another unique feature in that they house the radiant heating and cooling panels that heat and air condition the building. By placing this equipment in the ceilings, instead of along the outside walls, the architects were able to save approximately 15,000 sq ft of rentable floor area, or the equivalent of one and a half floors of the building.

Design and operation of the radiant heating and cooling system marks the first of its type ever to be installed in this country. It involves the use of .040 in. thick aluminum sheet panels as a finished ceiling. The panels are perforated for acoustical treatment. Above them is a grid of half-inch diameter aluminum tubing, installed in one-foot centers through which hot or cold water is circulated. Grids have been prefabricated in sections, approximately 6 by 12 ft.

A ¾ in. Ultralite blanket, laid atop the coils of aluminimum tubing, absorbs sound passing through the perforated holes in the sheet. The system is designed to handle all winter heating arrangements and 50 per cent of the summertime cooling needs.

Heavy-Duty Jib Crane Motorized to Swing Large Ingots

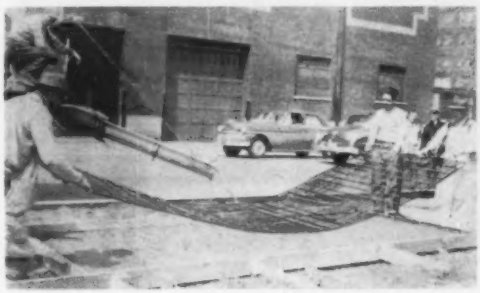


The recent additions to the Barberton, Ohio plant of the Babcock & Wilcox Co. included an unusually heavy jib crane. This crane, engineered by B & W personnel, is designed to handle ingots, weighing up to 26,000 lb, in the plant's draw bench area. Here, hollow, seamless forgings with maximum dimensions of 26 in. ID, 35 in. OD, and 22 ft length, are produced as integral parts of power boilers.

Features of the crane include extra welded bracing between the two supporting girders; motorized and geared drive for the turning pin, to speed swinging of the tremendous loads; and bus duct mounted on the jib beam itself, to furnish power to the two crane units.

Heating Cable Secured to Reinforcing Mesh in Sidewalk

One of the largest snow-melting installations using Thermwire electric heating cable was recently completed at the new John T. Ryan Memorial Laboratory of Mine Safety Appliances Company, Pittsburgh, Pa.



Seventy-two standard sets of 800 watts each were embedded in 1440 sq. ft of concrete sidewalk. With an installed capacity of 57.6 kilowatts, a heat intensity of 40 watts per sq. ft is obtained.

Installation was made in simple steps. The 160-ft cable lengths were first fastened to 5 by 20 ft sections of 6 by 6 commercial mesh with hog-ring staples. After the initial pouring of concrete, the mesh was laid in place and covered with another inch of concrete. Just before the concrete was smoothed the 10-ft cold leads were strung through piping and connected to junction boxes under the lawn.

Operating cost, based on an average Pittsburgh winter, is estimated at about $50 a year. This is lower than the cost of snow shoveling and ice-chopping.

Floodlights Permit 24-Hour Utilization of Outdoor Working Area

Six hundred floodlights are permitting round-the-clock utilization of 555,000 sq ft of outdoor working area at the Columbus, Ohio, plant of North American Aviation, Inc.

Forty-one banks of General Electric floodlights mounted at a height of 48 ft provide the light for the large outdoor working area which is used for final pre-flight testing of engines, fuel flow, radar adjustment, compass alignment, and painting.

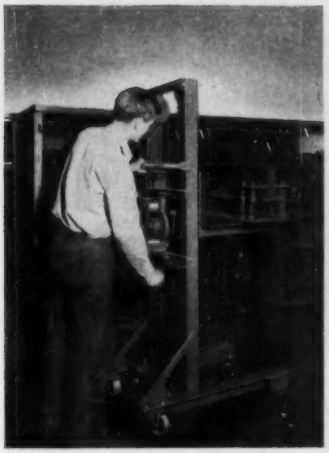
Installation of the floodlights has provided an additional night working area of almost 13 acres, and has made possible unrestricted movement of aircraft at all hours. Officials say that night accident rates in the outdoor area are no higher than daytime rates.

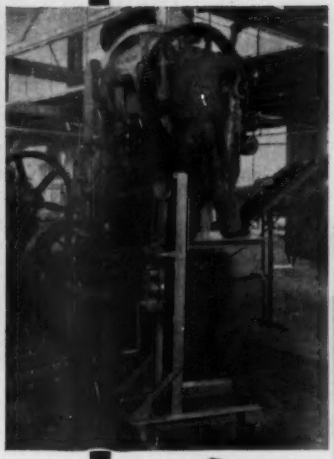
Outdoor Grating Turntable Helps in Materials Handling

A boon to outdoor materials handling is this turntable constructed with flooring of open steel grating. This type construction is particularly valuable where turntables are operated in open industrial yards located in "snow-belt" areas. Snow, ice, sleet and rain slither through the interstices and the area is kept clear. Grating lightens the floor weight as much as 40 per cent, says the manufacturer, Irving Subway Grating Co., on whose own plant grounds this turntable is installed. The table will carry as much as a 5-ton load.

BARRETT "5-HUNDRED" PORTABLE ELEVATOR

Your best investment for plant service





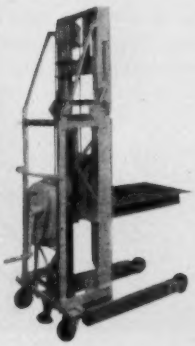
You don't have to *look* for lifting jobs to give this low-priced eager beaver . . . it *finds* them all around your plant—day in and day out. It goes right to the job . . . lifts or lowers . . . and moves on to other money-saving chores. That's Barrett "5-Hundred"—and its brothers—the famous all-purpose line of Portable Elevators with 500, 1000 and 2000-lb. capacities.

These hand-operated elevators are engineered for safe, easy, one-man use. Handle barrels, drums, bales, crates, boxes or dies . . . save time in loading and unloading . . . ideal for ceiling or overhead repairs . . . ready to double as a supporting bench for long steel, pipe or lumber lengths.

YES, SIR . . . you will find one of the "Hundred" line just suited to your plant requirements. It will save plenty of man-hours and space at a small investment.

GET THE *FULL* STORY—we will send complete details and prices promptly upon request.

MODEL "5-Hundred." Capacity 500 lbs. Crank operated. Lifting height 5'—platform 24"x24"x 5½" high. Also available with 7' lift.



MODEL "10-Hundred." Capacity 1000 lbs. Two-speed operation. Lifting height 6'4"—platform 24"x30"x7" high.

Also, Model "20-Hundred." Cap. 2000 lbs. Two-speed—Lift 5'8"—platform 24"x36"x7" high.

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Barrett Handling Equipment

BARRETT

ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

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STOP costly blink-blink-blink

WITH G-E WATCH DOG NO-BLINK FLUORESCENT STARTERS

The blinking of a failing fluorescent lamp not only annoys workers and lowers efficiency, but each blink costs actual money. It shortens the life of starters and ballasts—they burn out before they should. Here's how General Electric's Watch Dog* no-blink starters eliminate these needless costs.

- Watch Dog starters *stop blinking* by automatically turning off failing lamps that cause blinking.

- A Watch Dog starter *keeps the lamp off*—no recurring blinking every time fixtures are turned on.

- Because they eliminate blinking, Watch Dog starters *outlast* ordinary starters by as much as 10 to 1—ballasts also last longer.

Remember, too, emergency relamping is eliminated when you standardize on Watch Dog starters. And Watch Dog starters are essential to any schedule of group lamp replacement—the modern, economical method of lamp maintenance.

Specify Watch Dog no-blink starters for new fixtures—insist on them for replacement. You'll make important savings in maintenance costs and won't be bothered by blinking lamps. For all the facts on the Watch Dog starter line, write for a copy of folder Q46-1164. Construction Materials Division, General Electric Company, Bridgeport 2, Conn.

*Registered Trade-mark General Electric Company

For all replacement needs—use the famous Watch Dog no-blink starter with the red reset button.

And here is the tag to look for when you buy fluorescent fixtures. It is an indication that the fixture has been equipped with G-E Watch Dog no-blink starters.

You can put your confidence in—

GENERAL ELECTRIC

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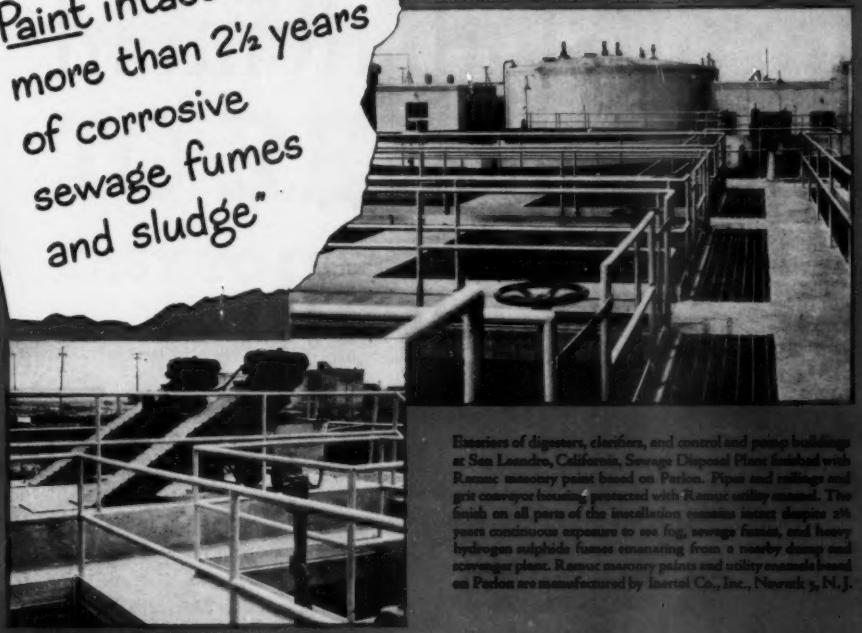
Parlon Stays On!

"Paint intact after more than 2½ years of corrosive sewage fumes and sludge"



Exteriors of digesters, clarifiers, and control and pump buildings at San Leandro, California, Sewage Disposal Plant finished with Ramuc masonry paint based on Parlon. Pipes and railings and grit conveyor housing protected with Ramuc utility enamel. The finish on all parts of the installation remains intact despite 2½ years continuous exposure to sea fog, sewage fumes, and heavy hydrogen sulphide fumes emanating from a nearby dump and scavenger plant. Ramuc masonry paints and utility enamels based on Parlon are manufactured by Inertol Co., Inc., Newark 3, N. J.

SEWAGE FUMES and sludge... hydrogen sulphide gases... heavy salt sea fog... heat... cold... condensation... day in and day out! How long can exterior paints take this punishment? At California's San Leandro Sewage Disposal Plant, Inertol's Ramuc paint based on Hercules Parlon (chlorinated rubber) continues to protect and beautify masonry and metal after more than 2½ years of severe exposure.

Wherever corrosion is a problem, not only in sewage disposal plants and water works, but in paper and textile mills, metal refineries, breweries —to name a few of the many places where Parlon-based finishes now serve—you can depend on these sturdy protective coatings to check attacks from acids and alkalies, to give better service at lower long-term costs. See your paint supplier for details on Parlon paints, or write:

Cellulose Products Dept., HERCULES POWDER COMPANY *966 Market St., Wilmington 99, Del.*

Parlon® CHLORINATED RUBBER PAINTS

AVAILABLE FROM 400 PAINT MANUFACTURERS UNDER THEIR OWN BRAND NAMES

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Your Management wants to know...

How to solve the dust abatement problem... economically

PLANT ENGINEERS, working with Buell engineers, have proven again and again that their know-how coupled with Buell's long experience in Dust Collection can solve your Fly Ash problems more economically, more efficiently.

What's more, Buell Dust Collection Systems offer all American industry these further advantages: smoother plant/community relations, improved product quality and better employee morale.

Buell's knowledge and experience in the highly specialized science of Dust Collection are yours. To learn more about Buell's **3 basic systems** of Dust Collection and how they can help you, send for the new, informative booklet titled, "The Collection and Recovery of Industrial Dusts." Buell Engineering Co., Dept. 14-K, 70 Pine Street, New York 5, N. Y.

VAN TONGEREN CYCLONE

'SF' ELECTRIC PRECIPITATOR

PRECIPITATOR-CYCLONE COMBINATION

TYPE 'LR' COLLECTOR

DUST HOPPER VALVES

ELECTRIC CYCLONIC

buell

ENGINEERED EFFICIENCY IN DUST COLLECTION

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EASY

TO READ

EASY TO OPERATE

And you get long, *accurate* service with these Fairbanks-Morse built-in advantages.

Fairbanks-Morse Dial Scales speed weighing because they're designed for easiest reading. The weighmen can read the correct weight at a glance. Even with drop weights applied, weights are still read right at the point of the indicator . . . no mental calculations are required. It's easier . . . faster . . . more accurate. Human errors are eliminated.

Check these features that mean fast, accurate weighing, with your Fairbanks-Morse weighing expert or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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a name worth remembering when you want the best

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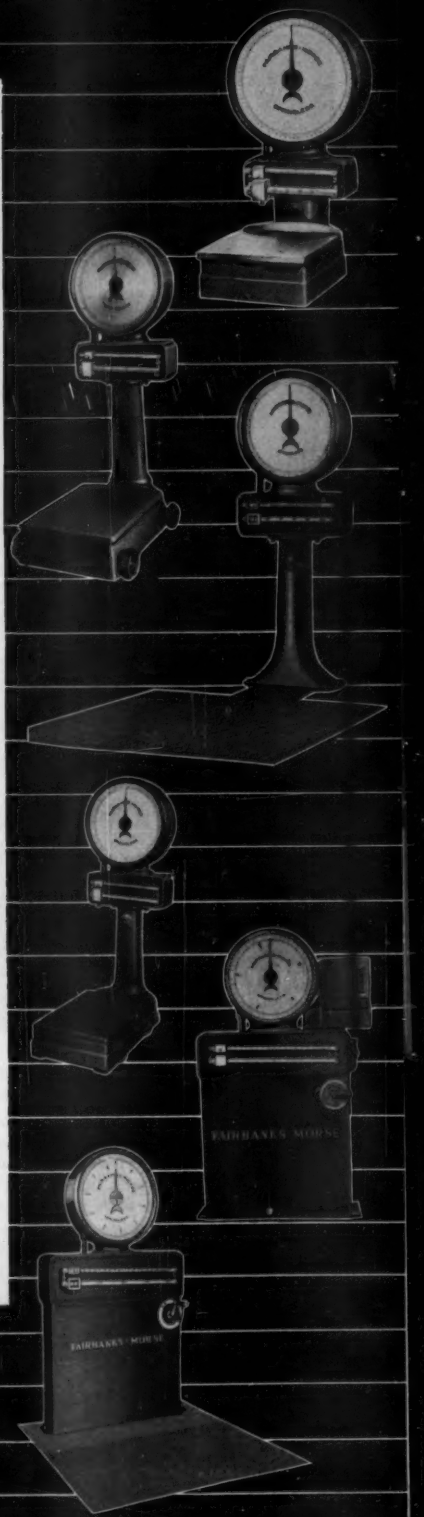
PUMPS • HOME WATER SERVICE EQUIPMENT • RAIL CARS
FARM MACHINERY • MAGNETOS



"Three anchor bolts hold it fast"
"Motor mounted high and dry"
"Single or duplex models"
"Only one principal moving part"
"Easily maintains high vacuum"

Who pays for sluggish steam circulation?

You do, of course. Steam in your boiler's not enough. It has to "get around"—rapidly and efficiently if you're to get full value from fuel dollars.

And steam *does* get through your lines rapidly . . . shortens "heat up" periods, too . . . when Dunham Vacuum Pumps are on the job. That's because they are able to regularly *produce and maintain up to 26 inches of vacuum.*

Dunham Vacuum Pumps are simple to install, are ready to operate when piping and wiring connections are made. They go in fast . . . then last and last. Maintenance is amazingly low. Full details are yours for the asking.

Send for Free Bulletin

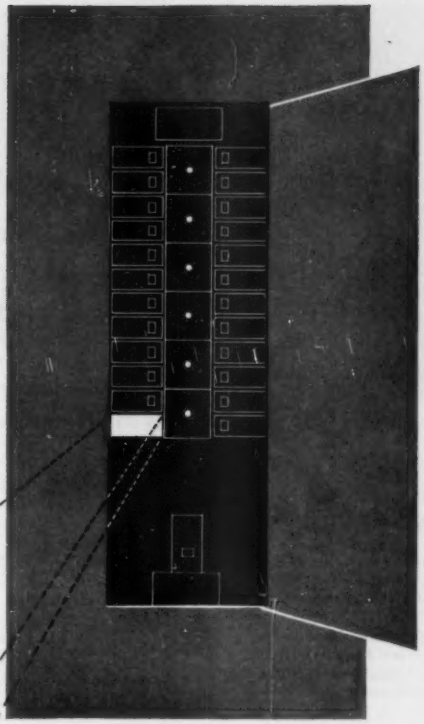
Bulletin 1401-20 gives full data on pump sizes, construction, capacities. For your free copy write: C. A. Dunham Company, 400 W. Madison Street, Chicago 6, Ill.

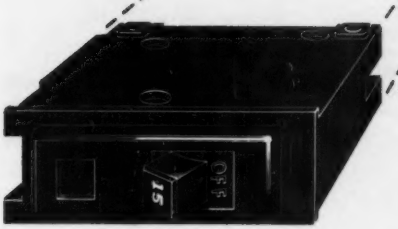
DUNHAM VACUUM PUMPS

ANOTHER QUALITY PRODUCT OF C. A. DUNHAM COMPANY—CHICAGO • TORONTO • LONDON

New...

Westinghouse type NPLAB circuit breaker lighting panelboard





. . .with industry's first "DE-ION" plug-in type circuit breaker

This new compact Circuit Breaker, the Quicklag P, makes possible radical reductions in the size of the panelboard enclosing cabinet, without reducing wiring gutters or sacrificing many of the other well-known advantages of the conventional Westinghouse Type NLAB Quicklag Panels.

Call your Westinghouse representative, or write for Panelboard Book B-5644, Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. J-93487

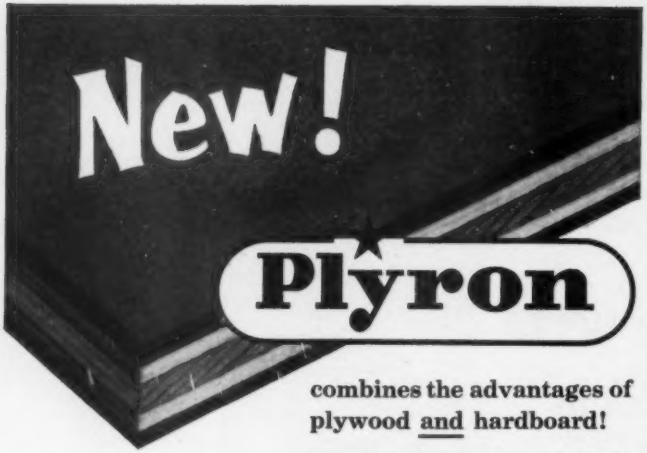
Saves space . . . without sacrificing quality

YOU CAN BE SURE...IF IT'S
Westinghouse

APPARATUS DISTRIBUTOR
WESTINGHOUSE

"DE-ION" BREAKER
PANELBOARDS

For more facts circle 593 on Reply Card



combines the advantages of plywood and hardboard!

proved uses for NEW PLYRON

Assembly tables, cutting tables, wrapping tables, counters, chutes . . . bins, shelves . . . signs, displays, cabinets, fixtures.

Base for decorative laminates for restaurant counters and bars . . . wainscoting, booths, banquet tables . . . truck bodies, boat decks and superstructures.

Exterior siding, floor construction, partitions . . . cabinet doors, wardrobes, built-ins . . . re-usable concrete forms for extremely smooth concrete surfaces.

Farm structures: bins, cribs, hoppers, chutes, stalls. Toys and novelties, patterns, templates . . . railroad car siding, lining, floors.

IN PLYRON, you get the best features of two proved panel materials. For Plyron is plywood with permanently bonded faces of smooth, uniform, durable hardboard.

Plywood gives Plyron strength*, rigidity and lightness. It won't split, puncture, shatter or crack. It's dimensionally stable, easy to handle, requires only standard woodworking tools.

Plyron has the surface smoothness of hardboard. It resists wear, won't dent. It's hard, dense, tough. Pleasing in color. An excellent base, too, for super-smooth paint or enamel jobs.

Plyron comes in standard plywood panel sizes, in thicknesses of ⅛", ⅜", ¾" and heavier. Produced in two types: moisture-resistant Interior, waterproof-bond Exterior. Glue bond meets performance requirements of U.S. CS45-48.

Plyron is your choice for jobs requiring both strength and surface quality. See your regular plywood supply source, or mail the coupon below.

* Only Plywood Brings You Two-Way Strength.
Cross-lamination gives strength along the panel, across the panel
Wood's natural along-the-grain strength works both ways in plywood—makes it strong, rigid, splitproof, puncture-proof, dimensionally stable . . . gives it large size, high strength-weight ratio.

Plyron
HARDBOARD FACED
PLYWOOD
D.F.P.A. INSPECTED

A Product of the Plywood Industry

DOUGLAS FIR PLYWOOD ASSOCIATION — Good USA Only
Dept. 4711A, Tacoma, 2 Washington
Please send me more information concerning NEW PLYRON panels. I'm interested in the following uses: .....
Name .....
Firm .....
Address .....
City ..... Zone ... State .....

For more facts circle 594 on Reply Card

NEW PRODUCTS

(Begins on page 128)

16—ROOF VENTILATOR is automatic, fan powered

In outward appearance the Airjet is simply a box built of galvanized copper-bearing steel. Complicated and costly mechanisms of earlier designs have been eliminated, manufacturer states, and there are no counterweights or other obstructions to hinder the free flow of air. Two hinged aluminum panels (actually louvers) form a weather-tight peak roof. They open automatically when the fan is started, close when it stops. When open, the air-stream serves to prevent entry of rain or snow. This ventilator is described as especially effective in clearing fumes and heat from above furnaces, foundry pouring floors, and vats. (Circle No. 16 on Reader Service Card for details.) Hartzell Propeller Fan Co.

17—PULLING UNIT offers hydraulic remote control

The Simplex Re-Mo-Trol, remote controlled hydraulic jack and puller, consists of a hydraulic pump connected by high-pressure, flexible hose to a ram with a tubular ram plunger. The center-hole construction of the ram permits it to be slipped over a shaft to provide straight-line torque-free

force for pulling or pushing or wheels, gears, bushings and shafts, company explains. Because the pump may be located 6 ft or more away from the ram, the unit may be used where cramped space or other factors rule out self-contained jacks or pullers.

These units with center-hole rams are available in capacities from 30 to 100 tons; pumps in models with 54 and 126 cu. in. oil capacities. (For descriptive literature circle No. 17 on Reader Service Card.) Templeton, Kenly & Co.

18—OUTDOOR MOTOR with extra weather protection

Carrying protection further than the splashproof design, this new motor for use in semi-outdoor and outdoor steam electric stations is designed to keep wind-driven heavy moisture out of its windings. Its intake velocity has been reduced to less than 600 fpm, so heavy rain particles cannot be drawn into the motor. Air moves vertically upward through side intakes into an expanded

Conserve Manpower with Completely Mechanized Scrubbing

New SELF-POWERED SCRUBBER-VAC

Cleans Vast-Area Floors "By the Mile"

Freedom of range and *four-in-one performance* combine to give this *Gasoline-Powered Combination Scrubber-Vac* its exceptional cleaning capacity. Operating independent of power lines, the machine is free to go wherever the operator guides it . . . working in and out of production areas with ease . . . *scrubbing continuously . . . actually cleaning floors by the mile!* And this single unit — *Finnell's 218G* at left — applies the cleanser, scrubs, rinses if required, and damp-dries the floor — *all in one operation.* Thus it is capable of cleaning up to 16,000 sq. ft. per hour!

Self-starting engine eliminates rope-pulling as a means of starting. The *218G* starts quickly and easily by pressing the starter button. Operator will shut off rather than idle the machine, and thereby prevent carbonizing, a cause of engine trouble. All working parts of the *218G* are operated by *one* engine (2 cyl., 4 cycle, 9.4 hp., air-cooled). And there are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate (up to 136 ft. per minute). Two 18-inch brushes give a 36-inch scrubbing surface. The powerful vac performs quietly. Gasoline only is used for fuel (no mixing required).

Whatever the area of your floors, find out what *you* would save with a *Combination Scrubber-Vac. Finnell* makes a full range of sizes, including *electric* as well as *gasoline* models . . . available on lease or purchase plan. It's also good to know *there's a Finnell man nearby* to help train your maintenance operators in the proper use of *Finnell Equipment* and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5311 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything for Floor Care — FINNELL

BRANCHES IN ALL PRINCIPAL CITIES

For more facts circle 595 on Reply Card

it feels heavier | ... and heavier

and HEAVIER... | WHEN YOU HANDLE IT BY HAND

USE

RAYMOND

Hydraulic

PALLET LIFT TRUCKS

- Let one man do the work of two men or more with a RAYMOND Hydraulic Pallet Lift Truck. You'll save time, save manpower, save money!
- What's the secret? Hydraulic power does the heavy lifting. Just a few pumps on the foot pedal and your load is set for smooth, easy hauling.
- RAYMOND Pallet Trucks squeeze into tight quarters . . . feature effortless pallet entry. Lightweight model shown here has 2,000 lb. capacity. Also available in Heavy Duty models with 4,000 or 6,000 lb. capacities.

MODEL L2P

DESIGNED FOR FAST HANDLING

RAYMOND Low-Lift Rider-Type Electric Truck. Travels up to 6 mph empty, 5 mph loaded. For long hauls, stock picking, loading, unloading. 4,000 lb. capacity.

RAYMOND

Electric Industrial Trucks
Hydraulic Elevating Equipment

The RAYMOND CORPORATION
Formerly LYON-Raymond Corporation
4374 Madison St., Greene, N.Y.

Send for Bulletins

Gentlemen: Please send me Bulletin 207, showing your full line of Hydraulic Lift Trucks. Also Bulletin 750 on your new Low-Lift Electric Truck.

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

For more facts circle 596 on Reply Card

NEW PRODUCTS

(Begins on page 128)

air space to further lower its velocity.

Among protective design details are rain gutters on the sides at the air intakes, which are located at a considerable height above the ground level, to keep out dust and dirt during dry weather. Screens over the intake openings serve to keep out larger particles, such as paper and leaves. The top of the yoke is slanted slightly to keep water from accumulating in puddles.

Ventilating air enters from the sides, around the circumference of the yoke, and makes a right angle turn at the top to go down into the fans at the end of the rotor. Discharge air passes down from stator core into the discharge chamber of the motor yoke directly underneath. Air from this chamber may pass out either end of the motor. During a strong wind, outside air can blow completely through this chamber without getting into the inside of the motor, company states.

No special concrete foundation or base is required with this motor. It is available in the full range of ratings required for major auxiliary drives, including boiler feed pumps. (For more information circle No. 18 on Reader Service Card.) Allis-Chalmers Mfg. Co.

19—AIR-GAS MIXER simplifies changing heating loads

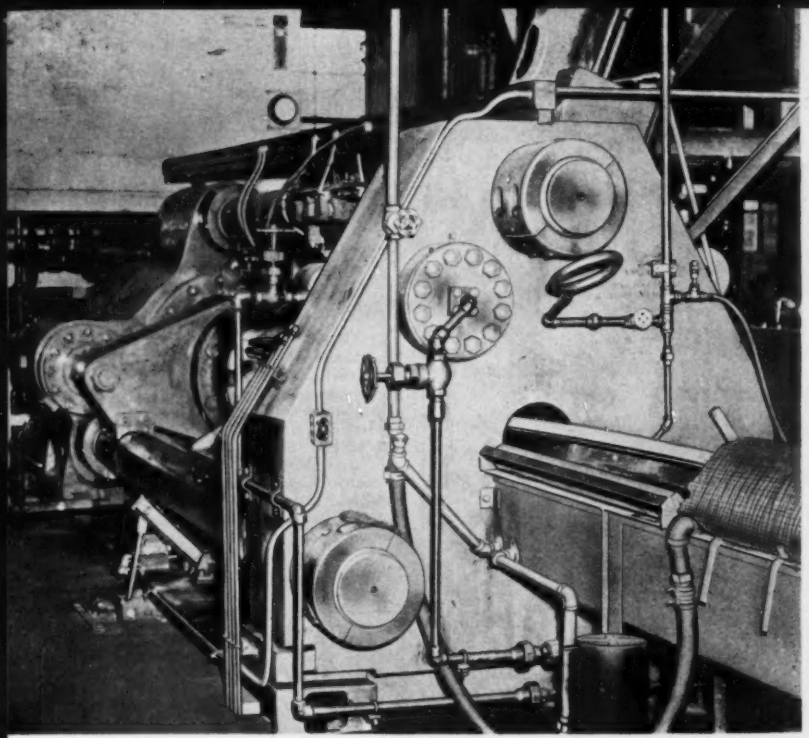
Changing heating loads on combustion equipment is simplified by the new Vari-Set Mixer, according to manufacturer—a built-in adjustable orifice eliminates replaceable jets, and changes volume of automatically proportioned gas and air for any Btu output within capacity of mixers used in furnaces, ovens and kilns.

Gas entrained by the air stream is automatically proportioned to form a mixture giving perfect combustion at all heating loads, company explains, and a metering valve regulates the pressure for operating control equipment and for burning mixed, natural or liquid petroleum gas. Advantages of the mixer are seen in industries where heating equipment is operated in series or in parallel. (For data circle No. 19 on Reader Service Card.) Eclipse Fuel Engineering Co.

20—AIR LINE INDICATOR shows up any moisture

This unit consists of a Pyrex glass cylinder filled with moisture sensitive blue granules, and has end plates tapped for ¼ in. pipe. It is placed in the line between the air supply and point at which the air is used. The granules stay blue as long as the air leaving the indicator is dry, and turn pink when it contains moisture or water vapor.

Four tie rods protect the cylinder and permit disassembly for recharging with dry granules. Units with glass cylinder are factory tested at 100 psi; indicators with clear plastic cylinders can be furnished for higher pressures. The in-



Puts squeeze on hydraulic press maintenance...

• Shown above is the 1250-ton hydraulic press used by the Light Metals Corporation of Grand Rapids, Michigan, for extruding variously shaped sections of aluminum. When this press was installed recently, officials gave the important hydraulic oil job to STANOIL Industrial Oil. They based that decision on their own experience with this outstanding oil.

That experience covered over four years' use of STANOIL in the hydraulic system of a 315-ton extrusion press. STANOIL has served continuously in this press without being changed or removed for oil maintenance. The hydraulic oil system has never been cleaned and has remained entirely free from deposits and varnish. Hydraulic operation has been efficient at all times.

The experience of the Light Metals Corporation is your assurance of STANOIL's ability to reduce hydraulic system maintenance to a minimum in your plant. This versatile oil will provide clean, dependable lubrication for such a variety of equipment as air compressors, reduction gears, and electric motors. The Standard Oil lubrication specialists will help you make the most effective use of STANOIL. Phone him at your local Standard Oil (Indiana) office. Or write, Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

STANOIL
TRADE MARK
Industrial Oil

What's YOUR problem?

D. R. Clay, of Standard Oil's Grand Rapids, Michigan, office, is the lubrication specialist who has helped Light Metals Corporation keep maintenance of hydraulic units at a minimum through use of STANOIL Industrial Oil.

He is one of many Standard Oil specialists located throughout the Midwest. These men have the practical experience and special training to handle lubrication problems on any type of operation.

Take advantage of the service offered by the lubrication specialist nearest your plant. You can contact him easily by phoning your local Standard Oil Company (Indiana) office. With his help, find how many different oils in your plant can be replaced by STANOIL Industrial Oil on such applications as:

Air compressors . . . no sticking or clogging of valves, less oil consumption in splash or circulating systems.

Speed reducers . . . less wear of gears and bearings during frequent cold starts or prolonged high-temperature operation.

Steam turbines . . . freedom from emulsions and sludge, fewer oil changes necessary.

Ring-oiled bearings . . . rings function immediately on starting, less bearing wear.

Circulating and bath systems . . . one oil for a wide variety of jobs.

STANDARD OIL COMPANY STANDARD *(Indiana)*

This is the SIGN of your

BEST-BUY LINE

—and it marks your BEST source of Materials Handling Service—Service that encompasses Technical Counsel, Plant Surveys, Operator Training and Engineering as well as expert Maintenance and Repairs. Look with confidence to CLARK's nation wide organization of Authorized Sales and Service Dealers.

ALABAMA: BIRMINGHAM
M-H Equipment Company
ARIZONA: PHOENIX
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Bigelow Robinson Co.
BRITISH COLUMBIA: VANCOUVER
National Machinery Company, Ltd.
CALIFORNIA: FRESNO 1
Robert H. Braun Company
CALIFORNIA: LOS ANGELES 22
Robert H. Braun Company
CALIFORNIA: OAKLAND 3
Glen L. Codman Co., Inc.
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J. N. Meade
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Whitmore Industrial Trucks.
FLORIDA: MIAMI
EquipCo, Inc.
FLORIDA: TAMPA
Whitmore Industrial Trucks
ILLINOIS: CHICAGO 4
Modern Handling Equipment, Inc.
INDIANA: EVANSVILLE 13
W. A. Marschke & Sons, Inc.
INDIANA: INDIANAPOLIS 5
W. A. Marschke & Sons, Inc.
INDIANA: SOUTH BEND 14
Materials Handling Equipment Corp.
IOWA: DAVENPORT
Big River Equipment Company, Inc.
IOWA: DES MOINES
Big River Equipment Company, Inc.
KENTUCKY: LOUISVILLE 7
W. A. Marschke & Sons, Inc.
LOUISIANA: NEW ORLEANS
Industrial Truck & Caster Co., Inc.
MAINE: PORTLAND
Brodie Industrial Trucks, Inc.
MANITOBA: WINNIPEG
J. H. Ryder Machinery Co., Ltd.
MARYLAND: BALTIMORE 6
Fallsway Spring & Equipment Co.
MASSACHUSETTS: BOSTON (Malden 48)
Brodie Industrial Trucks, Inc.
MICHIGAN: DETROIT 2
Material Handling Sales Corp.
MICHIGAN: GRAND RAPIDS
Material Handling Sales Corp.
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Material Handling Engineers
MISSOURI: KANSAS CITY 8
Lift Truck Sales & Service, Inc.
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Hull Equipment Co.
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NEW YORK: SYRACUSE 2
Brodie Industrial Trucks, Inc.
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Industrial Truck Sales & Service Co.
NORTH DAKOTA: FARGO
Sweeney Brothers Tractor Co.
OHIO: CINCINNATI 15
Robert C. Young & Co.
OHIO: CLEVELAND 11
Material Handling Equipment Corp.
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Edward J. Sherry Co.
OHIO: TOLEDO 4
Kern Truck Sales, Inc.
OKLAHOMA: TULSA 6
Arst Equipment Company
ONTARIO: FT. WILLIAM
J. H. Ryder Machinery Co., Ltd.
ONTARIO: TORONTO 5
J. H. Ryder Machinery Co., Ltd.
ONTARIO: WINDSOR
J. H. Ryder Machinery Co., Ltd.
OREGON: EUGENE
Preston Faller
OREGON: PORTLAND 5
Preston Faller
PENNSYLVANIA: HARRISBURG
Furnival Machinery Co.
PENNSYLVANIA: PHILADELPHIA
Furnival Machinery Co.
PENNSYLVANIA: PITTSBURGH 33
Material Handling, Inc.
QUEBEC: MONTREAL 9
J. H. Ryder Machinery Co., Reg.
SOUTH CAROLINA: COLUMBIA
Lukas Equipment Co.
SOUTH DAKOTA: SIOUX FALLS
Stan Houston Equipment
TENNESSEE: KNOXVILLE
Dempster Bros., Inc. (I.T.D.)
TENNESSEE: MEMPHIS
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Preston Faller
WASHINGTON: SPOKANE
Preston Faller
WISCONSIN: GREEN BAY
Wisconsin Industrial Truck Co., Inc.
WISCONSIN: MILWAUKEE 10
Wisconsin Industrial Truck Co., Inc.

In the Yellow Pages of your phone book, you will find your nearby CLARK dealer listed under "Trucks—Industrial"

INDUSTRIAL TRUCK DIVISION
CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 128)

dicator is 5 in. long by $2\frac{1}{2}$ in. square. Pressure drop is said to be less than 1 in. water at flow rate of 5 cfm. (For bulletin 323 on this circle No. 20 on Reader Service Card.) King Engineering Corp.

21—LEAD-LAG BALLAST is for rapid start lamps

The Model 254-601 Lead-Lag Ballast was developed expressly for two 40 w rapid start lamps. Advantages over series circuit ballasts are said to be independent lamp circuits, normal operation of ballast and remaining lamp if one lamp should fail, instant spotting of faulty lamps and maximum stroboscopic correction. In addition, this ballast is described as quiet, is as small as present series types and weighs about $6\frac{1}{2}$ lb. (For data circle No. 21 on Reader Service Card.) Jefferson Electric Co.

It's easy to obtain product data with the postage-free Reader Service Cards on pages 37-38 and 189-190. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

22—LATEX PAINT goes on fast and covers evenly

Fast-Working Arcotone Vel-Lure was developed to give "big job" painters the same production-speeding advantages that have made latex-base paints popular with home users. Because brush marks and unevenness disappear when the coating has dried, excessive working over is largely eliminated.

Twenty-minute drying and the absence of "painty" odor are other features announced, as are extra film toughness, washability, adhesion and ability to shed dust and grime. The paint may be brushed, sprayed or roller-applied, and used over most interior surfaces previously painted or unpainted. It may be applied over "hot" plaster, company says, so painters may follow plasterers with minimum delay. Except where previous coatings are calcimine or other water soluble paint, no primer is needed.

Twenty colors are offered, including pastels of company's "Color-at-Work"

HERE'S PROOF!

MULTI-WASH DUST COLLECTOR IS 99.9% EFFICIENT

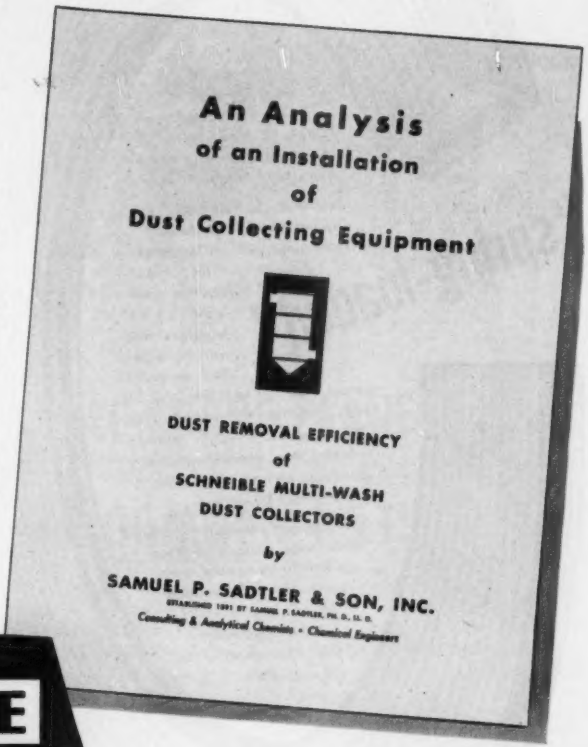
We have often stressed the efficiency of the MULTI-WASH dust collector but to prove our point we have had a scientific analysis made under actual production load by an unbiased outside laboratory.

A recent installation for a large nationally known company, was tested by Samuel P. Sadtler & Son, Inc. of Philadelphia, and proved to be 99.9% efficient. This high efficiency was even better than we had anticipated.

In the above mentioned test, some of the material removed was below sub-micron sizes and could not be appraised which might well account for being just a fraction of one percent under perfection.

For complete details of this test we offer a reprint of Samuel P. Sadtler analysis in its original form. This is available upon request and without obligation. Write for your copy today.

CLAUDE B. SCHNEIBLE CO.
P. O. Box 81, North End Station
Detroit 2, Michigan



SCHNEIBLE

CLAUDE B. SCHNEIBLE CO.
P. O. Box 81, North End Station
Detroit 2, Michigan

MAIL THIS *TODAY!*

Gentlemen:

Please send me ☐ copies of your Sadtler Analysis booklet without obligation.

Name_____ Title_____

Company_____

Address_____

City_____ State_____

PRODUCTS:

- Multi-Wash Collectors
- Uni-Flo Standard Hoods
- Uni-Flo Compensating Hoods
- Uni-Flo Fractionating Hoods
- Water Curtain Cupola Collectors
- Ductwork
- Velocitrap
- Dust Separators
- Entrainment Separators
- Settling and Dewatering Tanks
- "Wear Proof" Centrifugal Slurry Pumps

For more facts circle 599 on Reply Card

AJAX
Spiralwound Gaskets
Breathe with varying
Pipeline Stress

How much "give" to a dead piece of metal? How much bounce to the ounce of asbestos? Very little!

"spring-loaded"

But with Spiralwound, a "spring-loaded" preformed metal strip with an asbestos filler, you have a gasket that breathes with varying pipeline or boiler stresses. "The Spring is the Thing." It keeps joints tight at low bolt loads, seals irregular, pitted or warped surfaces, has enough resiliency, usually, to be used over again if the joint must be parted.

Get the spring-loaded multiple knife edge contacts of these gaskets to insure safe seals, always. Write for catalog or ask your favorite industrial distributor about them.

UNITED STATES GASKET COMPANY

FABRICATORS OF "TEFLON" & "KEL-F" FOR THE CHEMICAL PROCESS & ELECTRONIC INDUSTRIES
CAMDEN 1 NEW JERSEY

For more facts circle 600 on Reply Card

NEW PRODUCTS

(Begins on page 128)

Optonic System and functional deep-tones. (Catalog-type color cards and specification sheets are available; to get them circle No. 22 on Reader Service Card.) The Arco Co.

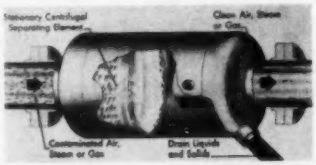
23—PULLER for removal of fuel injection nozzles

Puller HC-689, designed for removing the fuel injection nozzle from the cylinder head on International Harvester diesel engines, this tool is adjustable and may be used for other pulling jobs. Company says it is fast and efficient and does an otherwise difficult job in minutes. (For complete information circle No. 23 on Reader Service Card.) Owatonna Tool Co.

24—LINE-TYPE PURIFIER cleans out entrainment

Steam, air, gas and vapor lines can be cleaned up quickly by an improved Hi-eF Purifier which, according to manufacturer, combines increased separating efficiency with a more simplified design. This compact purifier is designed to perform automatically, without moving parts, and to remove virtually all dirt, oil, moisture and guck even at extreme velocities, pressures.

The purifier removes entrainment through a new stationary centrifugal

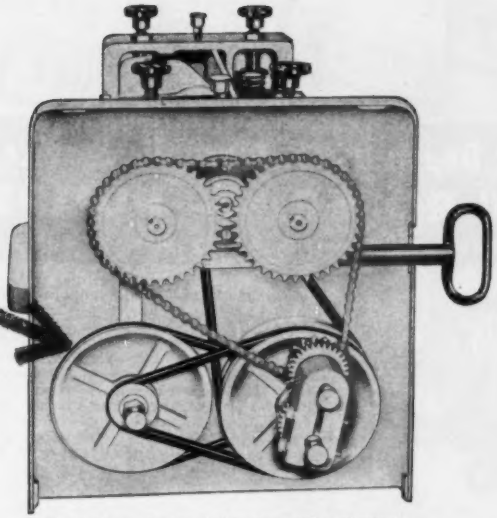

Stationary Centrifugal Separating Element
Clean Air, Steam or Gas
Contaminated Air, Steam or Gas
Drain Liquids and Solids

separating element. Entrainment laden vapor entering the unit is engaged by this element which imparts a controlled but rapid rotational motion to the vapor and throws solids and water outward to the walls of the purifier from where it is ejected out the drain. The entire action is said to occur without any appreciable drop in pressure.

Applications for the purifier include cleaning up steam from boilers, removing entrainment from gas lines between and after compressor stages, and removing entrainment in exhaust steam. (For descriptive Bulletin 200, circle No. 24 on Reader Service Card.) Purifier Div., V. D. Anderson Co.

25—NON-CONDUCTING PAIL to prevent electrical shock

Protecting industrial workers from high voltage shock is one of the latest applications of the Ace-Hide Pail. Made of a high-strength, rubber-plastic blend, the new pail is not only non-conducting, but declared far more durable than many pails previously used for shock protection around power lines and other electrical hazards.



teamed for top performance!

Feed roll drive mechanism of Boice-Crane 12" x 4" Thickness Planer employs three standard GILMER V-Belts to insure smooth, trouble-free operation. Manufacturer's literature says of this drive "thousands in use for up to 15 years without replacement or repairs."

BOICE-CRANE PLANERS . . .

AND GILMER V-BELTS

World's largest builder of 12" wood planers is Boice-Crane Company, Toledo, Ohio. Like so many other top-ranking machinery manufacturers, Boice-Crane has made it a long-standing practice to assure top performance of its products by equipping vital V-Belt drives with top-performing GILMER V-Belts.

Certainly, here is evidence of the most convincing sort that designers, engineers, manufacturers with reputations to uphold, recognize the fundamental soundness of GILMER V-Belt design . . . the uniform quality of GILMER V-Belt construction!

Take a tip from these men whose business it is to know which belts perform best . . . which give the greatest value for your V-Belt dollar. Start now to standardize on GILMER V-Belts.

These top-performing V-Belts and other famous GILMER products are now available through your NYB&P Distributor. He is ready and eager to give you the best in belts . . . the best in service!

Our Second Century of Service to Industry

NEW YORK BELTING & PACKING CO.

America's Oldest Manufacturer of Industrial Rubber Products

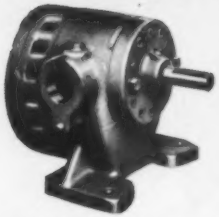
1 MARKET STREET—PASSAIC, NEW JERSEY

For more facts circle 601 on Reply Card

LIFT LOWER PUSH PULL

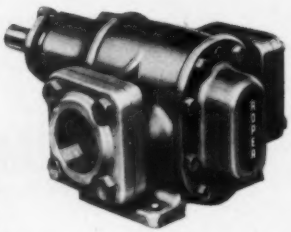
...for Dependable Hydraulic Service, install ROPER *Rotary* PUMPS

PRESSURES TO 1000 P. S. I.



Roper *dependable* Pumps! Smooth running units that add to the efficiency of diversified hydraulic applications. The Roper principle of only two moving parts—equal size pumping gears operating in a sturdy case with proper clearance—results in superior serviceability and promotes long life. The Roper Pumps illustrated are representative of standard pumps suitable for most installations. For unusual applications, let Roper engineers work with your design engineers in developing a special Roper to fit your needs.

SERIES H . . . Pressures to 1000 P.S.I.—Capacities 10 to 75 G.P.M. Spur gears operate in axial hydraulic balance . . . roller bearings and bronze wear plates reduce friction under heavy loads . . . splined drive shaft absorbs thrust loads. Most models can be direct connected, belt, or gear driven. Packed box or mechanical seal.



SERIES K . . . Pressures to 150 P.S.I.—Capacities ¾ to 50 G.P.M. Compact, yet sturdy enough to handle a wide range of jobs. Self-lubricated by liquid being pumped . . . handle total suction lifts up to 25 feet . . . come equipped with mechanical seal or packed box, with or without relief valve. Easy to install and apply.

SEE OUR CATALOG IN SWEET'S

SERIES F . . . Pressures to 300 P.S.I.—Capacities 1 to 300 G.P.M. Popular pumps that feature 4-port design (eight optional piping arrangements, 4 for clockwise and 4 for counter-clockwise rotation.) Supplied in standard or stainless steel fitted models to suit specific needs. Furnished with or without relief valve, with mechanical seal or packed box. Ideal for hydraulic power generation in a wide range of applications.

ROPER *Rotary Pumps*

Send For Catalog 952

GEO. D. ROPER CORPORATION
151 Blackhawk Park Avenue, Rockford, Illinois
☐ *Please Send Catalog 952.*

NAME_____

ADDRESS_____

CITY_____

COMPANY_____

For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 128)

The rubber-styrene copolymer of which this pail is made is one of a new group of materials with unusual strength and toughness. Manufacturer says the pail is practically indestructible—it literally bounces without denting or chipping. (For details circle No. 25 on Reader Service Card.) American Hard Rubber Co.

26—TEMP TRANSMITTER for electronic control systems

For chemical and food processing plants, refineries and central stations, the Type T2T Autronic Temperature Transmitter is designed primarily for use with manufacturer's all-electronic Autronic Control System. The transmitter consists of a resistance thermometer element (platinum wire wound on a ceramic core and sealed in an Inconel tube) and thermometer adapter unit. The latter converts resistance changes in the thermometer element to a proportional signal voltage. The thermometer element is connected to the adapter unit by a three-wire system that compensates for variations in lead wire resistance with ambient temperature change. The adapter unit features a removable range card giving fourteen 50 deg spans. (For full data on range spans and operation of transmitter circle No. 26 on Reader Service Card.) The Swartwout Co.

27—POLE-TOP ASSEMBLY can be lowered to ground

Safe, efficient ground level maintenance is claimed possible for lights mounted on standard metal poles of any height by means of this pole-top unit which incorporates company's disconnecting and lowering mechanism. Since the maintenance man works at ground level with a "dead" fixture (live contacts stay at pole top), there is said to be no climbing or electrical hazard.

The new unit includes a pole-top fitting complete with self-contained pulley, a divided mast-arm, stainless steel operating cable, and a mast-arm end fitting. This fitting, incorporating the hanger mechanism, features a self-contained "plumbizer" to provide for 8 deg adjustment either side of centerline. (Circle No. 27 on Reader Service Card for Bulletin WPH-52-2 describing this assembly.) Thompson Electric Co.

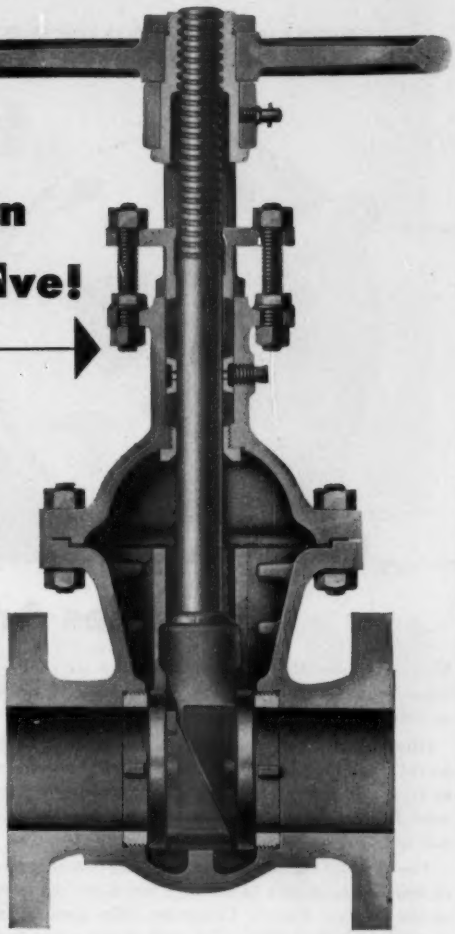
28—TRUCK ATTACHMENT for lifting drums, barrels

The Marvel Lift-o-Matic is for use with manufacturer's gasoline and electric fork trucks. It will handle any drum regardless of bead or rim size, company says, and can be attached in a few minutes by the operator. No additional controls are required—pick-up and release are effected through raising and lowering of the lift cylinder.

DARLING VALVES

FOR PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

Valve body distortion no problem for this valve!



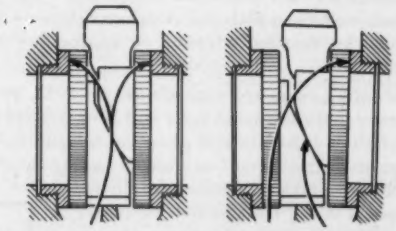
DON'T let costly valve maintenance and down-time headaches get you down! Lick these common valve troubles by installing Darling fully revolving double disc gate valves, with their unique wedging principle. They adjust *automatically* to compensate for valve body distortion—cinching tight, leak-proof closure.

The difference is in the fully revolving double disc, parallel seat principle of Darling valves. Just two plain, interchangeable no-pocket discs and two rugged wedges do all the work. Discs are completely free of pockets. Sediment and scale cannot collect to interfere with their free movement. No links or other devices are needed to hold the discs and wedges together. Any part can be quickly and inexpensively replaced without removing valve from the line.

It's easy to see why Darling valve users are money ahead because of the exceptional service made possible by the Darling design. That's why in plant after plant Darling gate valves are giving longer, trouble-free performance with minimum attention.

Darling features add up to gate valve service at its low-cost best! Send for the free Darling Valve Bulletin, today.

NOTE: Darling gate valves are made in a wide range of sizes, types and constructions, including solid and slotted taper-seat wedge types for all kinds of normal and corrosive services in pressures up to 1500 pounds.



Discs and seats are parallel.

Seats are forced out of parallel by body distortion but discs adapt themselves to give positive closure.

Radiused face of wedge allows discs to adjust tightly against both seats.

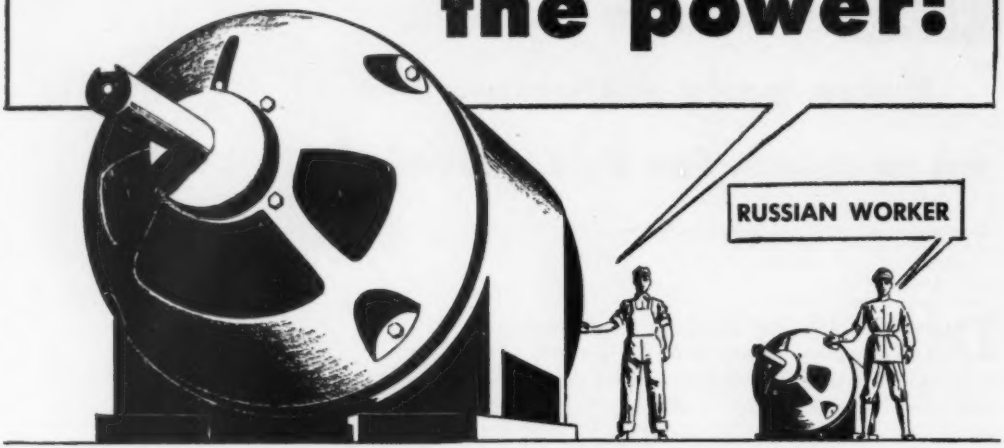
DARLING VALVE & MANUFACTURING CO.

Williamsport 14, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd. Galt 19, Ontario

For more facts circle 603 on Reply Card

AMERICAN WORKERS HAVE 7 times the power!



How does America do it?

Why does the American worker have the help of about 7 times as many kilowatt-hours of electric power as is available to the Russian worker?

How can we Americans produce over 40% of the world's goods and bring so much more of everything to everybody with less than 6% of the world's population? Why is the American output per-man-hour still growing faster and faster?

The answers cannot be laughed off nor are they hard to find. In the words of Ralph J. Cordiner, president of the General Electric Company: "The greatest impetus for forward movement still comes when individuals are free to plan and carry out their own ideas without government coercion or unnecessary regulation."

Including estimated expenditures in 1952, private industry in the last seven years will have invested over 150 billion dollars in new plant and equipment. This contrasts with Federal Government investment of not much more than 12 billion for similar purposes in the same period. Moreover most such Government expenses during the last three years have been allocated to military and atomic projects.

Back of all this progress in private industry is the unique American system of competition—our kind of competition that continually stimulates Americans to make things better and to sell them better—and at lower prices.

In America we do not just compete for public office; we also compete in technology, competency of management, individual initiative and distribution—the latter including selling and advertising in all their varied forms.

Our kind of competition promotes the growth of more and more businesses and industries—and this means more jobs and expanding prosperity from which we all benefit.

"Planned economies" and other fancy theories are not for us. The American competitive system has given us the highest standard of living in the world. Let's all work to preserve it.

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

NEW PRODUCTS

(Begins on page 128)

Drums can be tiered or removed at maximum fork height without pallets. And because there are no side projections, drums can be picked up and spotted in close positions. (For further details circle No. 28 on Reader Service Card.) The Yale & Towne Mfg. Co.

29—COMMUTATOR SAW for undercutting, other uses

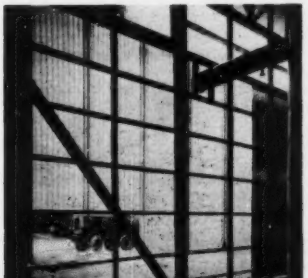
Although designed primarily for commutator undercutting, this saw may be used for other slitting and slotting work. Its principal design feature is a brazed ring which forms a part of the hub and makes hub and solid carbide blade bonded and rigid. Diameters on the saw range up to 3 in. (Circle No. 29 on Reader Service Card.) Gay-Lee Co.

30—CUTTING COMPOUND in concentrated form

Wax-Cut a compound for improving metal-cutting action and reducing tool wear, is now available in concentrated form so that users may prepare their own cutting solutions. The concentrate, a blend of waxes, can be mixed 10 to 1 with any type of oil, including reclaimed motor oil, and paraffin and sulfurized oils. When diluted, it serves as a wax-fortified cutting fluid for use in automatic screw machines, gear hobbers and cutters, milling machines and oil-type grinders. (Circle No. 30 for more information on this concentrate.) S. C. Johnson & Son, Inc.

31—STRUCTURAL PLASTIC has many glazing applications

This translucent sheet is a 4 oz. per square foot material. Fiberglas reinforced. It is described as shatterproof, possessing great flexural strength, and



economical. Manufacturer says it transmits up to 80 per cent softly diffused daylight and suggests it for glazing, skylights, canopies and awnings. The material is said to be non-corrosive and to be able to withstand all weather conditions.

The sheet comes in sizes up to 36 by 120 in., in clear, snow, slate, green or yellow. It may be nailed, drilled or

When You Anchor Machinery On...

UNISORB®

You can say "good-bye" to uneconomical bolt-and-lag-screw mounting methods when you use UNISORB mounting. We supply a special cement which securely bonds the UNISORB pads to machine feet and floor with a holding strength of at least 90 lbs. per square inch.

UNISORB is ideal for any kind of machinery . . . on any kind of flooring.

What's more, UNISORB does away with 60%-85% of all transmitted machine vibration and noise . . . prolongs life of machinery, buildings and floors . . . improves worker morale and efficiency . . . permits maximum machine speeds, higher output.

UNISORB is also available pre-coated with adhesive, but is not recommended for use with machines that require shimming.

You Reduce VIBRATION NOISE MAINTENANCE

with UNISORB Mountings

- no bolts, no lag screws, no holes to be drilled, no floor damage.
- Felters adhesive holds for keeps, yet permits re-positioning of machines. (Our UNISORB Booklet tells you how.)

VISIT OUR BOOTH PLANT MAINTENANCE SHOW

THE FELTERS COMPANY

210-Z SOUTH STREET, BOSTON 11, MASS.

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis
Sales Representative: San Francisco
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MAIL COUPON FOR FREE BOOKLET TODAY!

Please send my free copy of the booklet containing the complete story of UNISORB Mounting.

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COMPANY.....
STREET.....
CITY..... ZONE..... STATE.....

For more facts circle 604 on Reply Card

When servicing costs are high as the lights . . .

Lower Both Lights And Costs With Thompson Hangers!

You're losing money when you use two men and a lift truck to service lighting fixtures . . . *and you're risking someone's neck!* THOMPSON disconnecting and lowering **HANGERS** facilitate rapid, safe, efficient floor-level maintenance of high-bay lights.

You can assure maximum round-the-clock lighting efficiency by following a planned maintenance program. And remember . . . *there is no faster, safer or more economical means of servicing overhead lights than with THOMPSON HANGERS. Simple manual operation is exercised at floor level.*

Write today for new illustrated Bulletin TH52 for additional details.

464-TE

1. DISCONNECT 2. LOWER 3. SERVICE 4. REPOSITION 5. REPEAT

THE THOMPSON ELECTRIC CO.

1165 POWER AVENUE • CLEVELAND 14, OHIO

For more facts circle 605 on Reply Card

NEW PRODUCTS

(Begins on page 128)

sawed with ordinary tools. (Circle No. 31 on Reader Service Card for literature.) The Plexolite Sales Co.

32—DIE PULLING TRUCK of increased maneuverability

Improved operator vision and better maneuverability are said to characterize this new die pulling truck. Intended for handling stamping and forging dies on and off press beds, it is also suggested as load carrier and machinery mover. A power operated cable winch on the uprights pulls heavy loads on the load platform. A 30,000-lb capacity model has a platform 72 by 48 in. and a lifting height of 47¼ in. Electric power steering of wheels by lightweight direction indicating steering handle facilitates maneuverability. Motive power is supplied by storage battery or gas-electric unit. (For construction details on this puller, circle No. 32 on Reader Service Card.) Elwell-Parker Electric Co.

33—GEAR GRINDER designed for speed, accuracy

This grinder is claimed capable of producing gears at a faster rate and with more constant uniform accuracy than ever before achieved in mass production. The grinding method utilized is described as unique in that the periphery of the wheel is formed with a helical rib by a combination of company's Crushtrue and diamond dressing. The gear blank mounted on a mandrel between vertical dead centers, rotates continuously at a set rate in direct relationship to the grinding wheel into which it is fed in an upward direction during the grinding operation. Work drive and grinding wheel drive are interconnected by gearing which can be changed as required by the number of teeth to be ground.

Without stopping the wheel, work can be removed from the machine for inspection and when replaced, be automatically located without further adjustment. The machine will accommodate gears up to 8 in. dia and will grind up to 4 in. teeth. (To obtain details and specifications, provided in Catalog 140, circle No. 33 on Reader Service Card.) The Sheffield Corp.

34—ADHESIVE for rubber tile in contact with earth

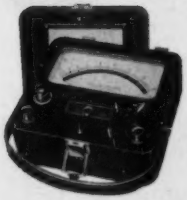
KenSet Adhesive 7 is for installation of this manufacturer's KenRubber Tile over on-grade concrete underfloors that are at least 12 in. above surrounding ground level and with drainage away from the building. The new adhesive is supplied in a unit consisting of a can of powder and a can of liquid to be mixed in a steel mortar mixing box. Each unit, when mixed, covers approximately 180 sq ft. The tile should be set within 10 min after spreading the mixture. It is pointed out that the fill

Dependable Electrical Measurements

FOR LABORATORY—PRODUCTION TESTING—MAINTENANCE

INDUSTRIAL CIRCUIT TESTER

(Model 785) A multi-range, multi-purpose, ultra-sensitive analyzer, for laboratory and industrial checking of electrical and electronic circuits. Has 28 practical scale ranges; measures d-c and a-c voltage, d-c and a-c current, and resistance. Accessories available to extend ranges. Compact and portable; furnished in either oak or steel case.



ULTRA SENSITIVE PORTABLE TEST INSTRUMENTS

(Model 622) High sensitivity, large scale A-C and D-C instruments of double pivoted type, ideal for precision measurement of low potentials and minute current. Available in single or multi range as D-C voltmeters, millivoltmeters, milliammeters, microammeters; and milliammeters and voltmeters in thermo and rectifier types for RF and A-C.

A-C AND D-C PORTABLE TEST INSTRUMENTS

(Model 931) Comprising a group of matched a-c and d-c portable test instruments; the universal favorites for highly accurate general test work. Available as voltmeters, ammeters, d-c and single phase a-c wattmeters—a-c and d-c voltmeters. Long, readable hand-calibrated mirror scales. The d-c instruments have new self-shielding mechanism.

HIGH FREQUENCY ELECTRONIC ANALYZER

(Model 769) A three-in-one instrument providing a self-contained Volt-Ohm-Milliammeter, a high impedance electronic D-C Volt-Ohmmeter, and a probe type vacuum tube voltmeter for use to 300 megacycles. Exceptionally stable and accurate. Has specially designed extremely small RF and D-C probes.

PANEL INSTRUMENTS OF HIGH SENSITIVITY

In all types, sizes and ranges for all critical measurements encountered in electronics, nuclear research and general testing. All D-C, rectifier type A-C and RF instruments have built-in magnetic shunts for minor adjustments if necessary.

A-C CLAMP VOLT-AMMETER

(Model 633, Type VA-1) For convenient and rapid measurement of a-c voltage and current without breaking the circuit. Jaws take insulated or non-insulated conductors up to 2" diameter. Safe, rugged versatile. Also available as a-c clamp ammeter, without voltage ranges.

Literature on these and other WESTON instruments for electrical and electronic requirements sent on request.
WESTON Electrical Instrument Corporation, 617 Frelinghuysen Avenue, Newark 5, New Jersey
. . . manufacturers of Weston and TAGliabue instruments.

WESTON *Instruments*

For more facts circle 606 on Reply Card

STOP Irritating Production Delays

Latest Improved Dual-Element Fuse

JEFFERSON SAF-T-LAG FUSES

Sure Protection

No Unnecessary Shutdowns

Long Time Lag

How To Select Fuses For Proper Motor Protection

• Jefferson provides a complete chart for proper fuse selection, 1.3 amps. to 600 amps., — for single and three phase motors, all standard voltages — for "Ordinary" service and "Heavy" service. Write for Folder 482-ST.

JEFFERSON ELECTRIC COMPANY
Bellwood, Illinois

PIONEER MANUFACTURERS OF FUSES OF ALL TYPES, RENEWABLE AND NON-RENEWABLE. SOLD THROUGH ELECTRICAL WHOLESALERS EVERYWHERE.

For more facts circle 607 on Reply Card

NEW PRODUCTS

(Begins on page 128)

under the concrete must be cinders, crushed stone or sand, and the underfloor must be free of dirt, grease and foreign matter before adhesive is applied. (Circle No. 34 on Reader Service Card for more details on KenSet Adhesive 7.) Kentile, Inc.

Further details on any product are available without cost or obligation. Circle item numbers on Reader Service Cards on pages 37-38, 189-190.

35—SPRAY BOOTH COATING is fast drying plastic

Vincote is a new vinyl-type paint spray booth coating developed for use on the side walls of both water-wash and dry paint spray booths. It's described as rapid drying and, when sprayed on a wall, as forming a tough plastic film with high tensile strength. Its low adhesive properties reduce maintenance, it is pointed out—when paint overspray is built up to a point where removal is indicated, coating and all over-sprayed paint are peeled off in sheets. Vincote can be applied with standard spray equipment; a gallon covers 275 to 400 sq ft. (Circle No. 35 on Reader Service Card for additional information on Vincote.) Detrex Corp.

36—VARIABLE SPEED DRIVES are enclosed, fan cooled

Speed-Trols, variable speed electric power drives, in the range of 20 to 25 hp, with 2 to 1, 3 to 1 and 4 to 1 speed variation, are now available in totally enclosed, fan-cooled models. Air inside the motor is continuously circulated by the large diameter internal cooling fan through unobstructed air passages between motor housing and stator, over motor windings and through openings in the rotor, keeping circulating air in continuous contact with motor housing. (Circle No. 36 on Reader Service Card for more details on this drive.) Sterling Electric Motors, Inc.

37—SHUT-OFF DEVICE for vacuum cleaner motors

Industrial vacuum cleaner motors can be protected against flooding troubles due to overloaded vacuum tanks by this electronic motor shut-off, according to manufacturer. The shut-off is an independent wiring system which includes two electrodes mounted parallel at the base of the turbine. It is claimed that as little as one drop of water crossing these electrodes will cause them to break the circuit and shut off the motor. Further protection is provided in that the motor can't be started again until the electrodes have been dried, vac tank emptied, filter drained and the

YOU PAY NOTHING EXTRA FOR Amocel

...THE MAINTENANCE-SAVING PIPE INSULATION

Amocel for commercial uses—like famous Unarco higher-temperature Unibestos—is made from strong, resilient Amosite asbestos fiber. Designed for temperatures up to 600° F., it's a premium product in every way—clean appearance, long life, high efficiency—and it's easy to fit so you save from the first with this better insulation. Made in standard, 1½", and 2" thicknesses for pipe sizes from ½" to 12" in half-rounds with jacket and metal bands. Your Unarco Distributor has Amocel. Call or write for literature.

- UNHARMED BY MOISTURE, STEAM, OR FUMES
- LIGHT, STRONG—WITHSTANDS IMPACT AND VIBRATION
- MAY BE REMOVED AND REUSED REPEATEDLY WITHOUT DAMAGE OR LOSS OF EFFICIENCY

UNARCO

UNION ASBESTOS & RUBBER COMPANY

DEPT. J-11 332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

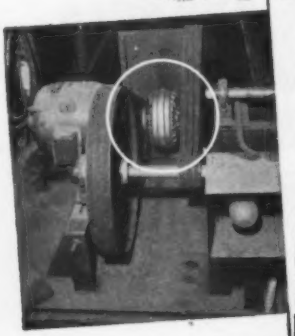
For more facts circle 608 on Reply Card

Man Missing!
...but *NOT* missed

The man who used to operate the reversing wheel on the carriage which conveys structural steel to this Beatty Press is somewhere else. He's doing a *more necessary* job for the Robberson Steel Company of Oklahoma City, since that concern joined the thousands of industries which have solved motor and equipment damaging shock loads with Twin Disc's power cushioning HYDRO-SHEAVE® Drive.

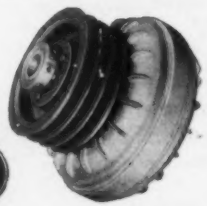
Since the HYDRO-SHEAVE® was installed, the press operator also controls the return. He runs the carriage forward, then reverses the motor and brings the carriage back without danger of burning up the motor or tearing up the drive mechanism. Work cycles are speeded, too. And the 3 hp. Reversing Squirrel-Cage Motor does a bigger job than is possible without the HYDRO-SHEAVE®.

The HYDRO-SHEAVE® is one of the wide range of Twin Disc fluid and friction drives used throughout industry to apply productive power—and backed by the most thorough service available in the power field. Eight Factory Branches and 60 Parts Stations carry a constant inventory of $3¼ million of repair parts and replacement units. 67 Hydraulic Dealers stock and install Twin Disc Hydraulic Drives.



A complete conversion unit as easy to mount as a sheave, Twin Disc's HYDRO-SHEAVE® Drive, helps motors and engines from ¾ to 30 hp. do a bigger, faster, smoother job. Described in Bulletin 145-B.

Twin Disc HYDRO-SHEAVE® Drive



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin · HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · NEW ORLEANS · SEATTLE · TULSA

For more facts circle 609 on Reply Card

NEW PRODUCTS

(Begins on page 128)

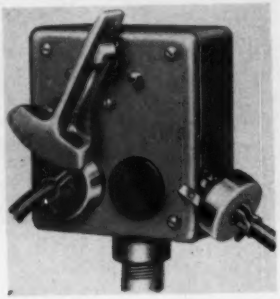
motor switch turned off and back on.

Several models of this company's industrial vacuum cleaners are being offered with the electronic shut-off as standard equipment. (For complete details circle No. 37 on Reader Service Card.) Multi-Clean Products, Inc.

38—INTERLOCK DEVICE is designed for cord sets

This new interlocking receptacle is designed to permit use of cord sets in hazardous locations. It incorporates a sealed mercury switch which de-energizes each socket before a plug may be inserted or removed, to eliminate danger of sparking.

The mercury switch works on a cam lever which locks cord set caps in position after they are inserted. In locked



position the mercury switch completes the circuit. A flip up of the cam lever tilts the switch, breaks the circuit and lets cord caps be pulled out safely, it is explained. The new device incorporates standard, single or duplex receptacles to fit conventional cord sets. Ratings of 115 v, 20 amp, or 250 v, 10 are available. (For data circle No. 38, Reader Service Card.) Tigerman Engineering Co.

39—FLOOR RESURFACER for heavy industrial traffic

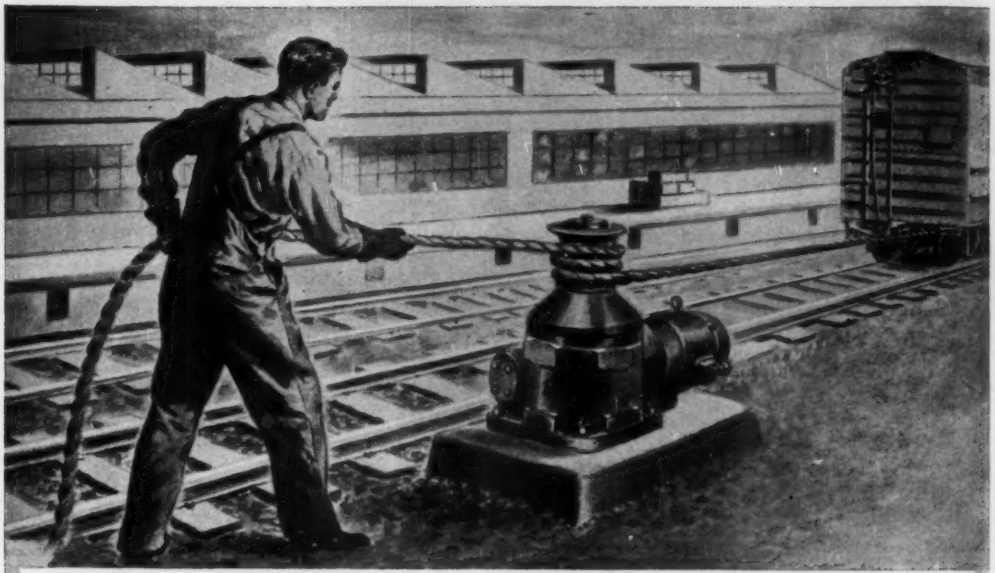
Worn floors can be given a smooth jointless surface with this economical resurfacer which is said to combine the durability of concrete and the flexibility of wood. According to manufacturer, it is non-dusting and fire-resisting, will stand vibration and will not splinter, warp or crack. It is also described as warm and easy on the feet. It comes in a complete unit and after application a floor is ready for use overnight. Five colors and natural are available. (For information circle No. 39 on Reader Service Card.) Flexrock Co.

40—ELECTRIC TRUCK is low lift, riding type

A new addition of manufacturer's line of trucks in the Spacemaster Model M, a low lift riding type electric truck available in platform or pallet types. It is designed to raise 4000-lb loads off

Speed? Safety? Savings?...You'll get all 3 with a

LO-HED CAR PULLER



IT HAS BEEN PROVED on hundreds of installations. Install a Lo-Hed Car Puller at your railroad siding, and cars will be loaded and unloaded in a lot less time than before. Besides that, with a Lo-Hed to do the job, workmen stop pushing cars by hand and you've eliminated a frequent cause of industrial accidents. And for full measure, a Lo-Hed Car Puller cuts your demurrage costs and puts a complete stop to bills for shifting charges.

The Lo-Hed Car Puller can be just as handy and thrifty *inside* a plant, too. It pulls anything within its capacity that can roll or slide . . . up grades and around corners.

For new efficiency and economy, mail coupon today for the full story about the rugged, electrically-driven Lo-Hed Car Puller.

LO-HED MEANS LOW OVERHEAD

LO-HED HOISTS have many special advantages that bring new speed, ease and economy to materials handling. They're built for longer working life; come in five suspension types; capacities from 500 to 24,000 lbs.

AMERICAN ENGINEERING

COMPANY

PHILADELPHIA 25, PENNA.

AE Products are: Taylor and Perfect Spread Stokers, Marine Deck Auxiliaries, Helo-Shaw and Hydrumite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers.

American Engineering Company
2503 Aramingo Ave., Philadelphia 25, Pa.

Gentlemen: Kindly send me full information about ☐ Lo-Hed Car Pullers . . . ☐ Lo-Hed Hoists.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

For more facts circle 610 on Reply Card

CALL YOUR *Ramset* DEALER FOR "on-the-job" SERVICE

That's because he is skilled in adapting RAMSET tools, fasteners and other products into an integrated service to meet the specific requirements of the work. He is no "long-distance, white-collar operator"—but will put on his working clothes and show your men, right on the job, how to apply RAMSET SYSTEM to save you time and money.

Behind him, he has a highly skilled and long-experienced headquarters staff that will help him on especially unusual or difficult jobs. Someway or other, whether it's a big project or a little one, he will give you a practical answer that will show you how to save time and money with RAMSET FASTENING SYSTEM. Call him any time, without the slightest obligation.

Tru-Set Fasteners matched to the job

Guided by the exclusive Red-Tip Pilot, RAMSET Tru-Set Fasteners go straight to the work, accurately, tightly, permanently. With 54 sizes of drive pins, external and internal threaded studs available, you can select a Tru-Set Fastener closely matched to almost any job, and be assured of prompt delivery from your dealer.

See the new JOBMASTER

Latest RAMSET development, with 10-Star Values that bring new ease, speed, economy and utility. Light, compact, one-piece tool is easy to use, can work in tight corners or otherwise inaccessible locations. Ask your dealer for demonstration and proof of its money-saving advantages.

Ramset Fasteners, INC.

Ramset Division, Olin Industries, Inc.
12117 BEREA ROAD • CLEVELAND 11, OHIO

For more facts circle 611 on Reply Card

NEW PRODUCTS

(Begins on page 128)

the floor and move at an ideal speed—since it carries both load and operator higher speeds are possible than with walkie trucks. An outstanding feature is its ability to work in minimum aisle space and cramped areas; the platform type with a 48-in. load operates in 6 ft aisles and the pallet type with similar load length in 7 ft aisles. (For more information on the Model M circle No. 40 on Reader Service Card.) Lewis-Shepard Products, Inc.

41—GREASE FITTINGS made with flush-type heads

The problem of protruding heads of grease fittings being knocked off by a heavy blow or collision is claimed to be remedied by these new flush-type grease fittings. They are made with a ball check. Supported by a spring, the ball prevents oil or grease leakage caused by back pressure, manufacturer explains. This ball, which holds the opening normally closed and cannot be unseated, is depressed for oiling or greasing; and the back-up spring is designed so passage through it at point of fullest depression is greater than the opening at the top of the fitting to provide for free flow of lubricant. (For catalog describing fittings, circle No. 41 on Reader Service Card.) Universal Lubricating Systems, Inc.

42—RETRACTABLE REEL for handling electric cable

Latest and most versatile of this company's Powereels, is the new Spring-O-Matic which can be supplied for handling up to 150 ft of multiple conductor rubber cables in sizes up to No. 4, and for use with sound or communication cables. The reel is made lightweight yet durable through the use of cast aluminum wherever possible.

A distinguishing feature is a ratchet which functions in any of four positions, so that the reel may be mounted on the floor, ceiling or right or left wall. This ratchet is optional, can be locked in or out of functioning position. The reel also incorporates an adjustable cable guide, which can be moved to desired position on the circumference of the reel to permit pull-down, pull-up or pull-out unwinding. Mounting bracket is well under the reel and less than its width to conserve mounting space required. (Circle No. 42 on Reader Service Card for further details.) Industrial Electrical Works.

43—WIPING CLOTH for removing static electricity

With a simple wipe De-Stat Cloth removes static charges and prevents their recurrence on such materials as plastics, and plastic-base paints, synthetic and natural rubbers and rubber-base paints, according to manufacturer. The cloth measures 18-in. square and is impregnated with a chemical compound

HALLOWELL'S NEW "640" SERIES

3 BASIC MODELS with 5 BASIC PARTS for your convenience

MODEL	COMPONENT PARTS
640	1 bench top 1 drawer unit 1 cabinet unit 2 bases
643	1 bench top 2 drawer units 2 bases
646	1 bench top 2 cabinet units 2 bases

UNIT work benches

Multiple Unit design—only five component parts—enables you to *custom build* HALLOWELL Unit Work Benches to fit your requirements. Ample storage space encourages good housekeeping. Standardized construction permits individual or continuous bench installations . . . provides interchangeability with existing HALLOWELL Work Benches of similar dimensions. Write for literature today. STANDARD PRESSED STEEL CO., Jenkintown 26, Pennsylvania.

HALLOWELL SHOP EQUIPMENT DIVISION SPS

JENKINTOWN PENNSYLVANIA

For more facts circle 612 on Reply Card

WITH A DART YOUR CLOSURE IS DROP-TIGHT AND YOU KNOW IT!

Dart's two bronze seats maintain tight seal as long as in service — and as often as piping is changed. They can be taken off the line and reinstalled *over and over again!* They're made of non-corrosive bronze for greatest protection against corrosion and pitting.

Yes, and because a Dart's precision ground to a perfect sphere, the tight seal comes easily and stays tight without heavy wrenching or fuss.

Ends and nut of a Dart are practically indestructible — they're made of high test air refined malleable iron. Stress, stretching and wrench abuse are no problems with a Dart.

Specify Dart Unions. You'll get maximum possible work life, drop tight closures, repeat use and easier installing — ALL IN ONE "PACKAGE".

DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co. — Distributors
Boston New York Pittsburgh

DART UNIONS

For more facts circle 613 on Reply Card

NEW PRODUCTS

(Begins on page 128)

—if kept free from dirt it is claimed to last indefinitely.

Company also manufactures cloth in 36-in. wide pile fabric yardage for use on rollers for manufacturing applications where the material is rolled in a continuous process and destaticizing can be done simultaneously and where sheet material is to be printed before final fabrication. It is pointed out that materials so destaticized can be washed with soap or detergents without losing their anti-static qualities.

The regular De-Stat Cloths are packed 12 to a box, costing $24.00. (For information circle No. 43 on Reader Service Card.) Globe Laboratories.

Reader Service Cards are provided for your use on pages 37-38 and 189-190. They require no postage.

44—HANDLING BOX is all aluminum, welded unit

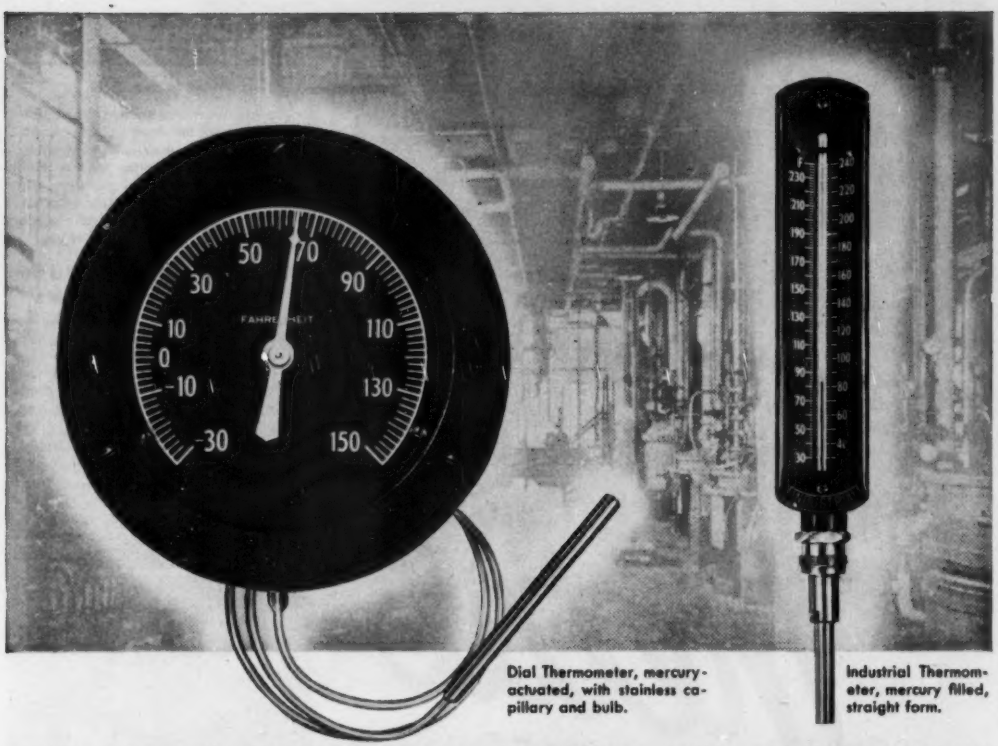
This box measures 60 by 42 by 36 in. and is of welded construction, using 61S alloy sheet and extrusions. Designed for and used in company's own plants, boxes like this serve a double purpose, handling both finished products and scrap. Mounted on low runners, they may be lifted by fork trucks and carried, stacked, or turned over and contents dumped. Tiering lugs facilitate stacking.

Reduced weight is a feature. The box weighs only 245 lb and will carry a 5000 lb load, it is pointed out, and the aluminum offers the further advantage of resistance to corrosion and corrosive fumes. (For more details on this box circle No. 48 on Reader Service Card.) Aluminum Co. of America.

45—DIE LUBRICANT acts to increase production

A new drawing compound, the X-60, is said to greatly increase production per die dressing by limiting the heat generated. Applicable for both simple and reverse dies, X-60 is also said to give improved surface finish due to the elimination of pick-up. Function of the compound in drawing operations is based on the dynatomics theory of limiting heat generated rather than heat transfer of conventional die compounds, company explains; the active ingredients in X-60 unite with the atoms in the work piece (to normalize the stressed section.) The material becomes active at a temperature of 550 F, it is noted, well below the critical temperature of dies and work.

Due to the absence of pigment in the material X-60 will not deposit or gum on presses or ways, it is claimed, and corrosion is not a problem because the material does not break down, and it has a pH of 7. It also serves as a pro-



Dial Thermometer, mercury-actuated, with stainless capillary and bulb.

Industrial Thermometer, mercury filled, straight form.

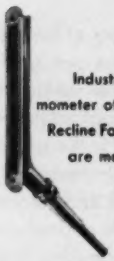
WILL THEY STAY HONEST WHEN THE HEAT'S ON?

Rigid quality control and thorough testing of every USG Thermometer under actual operating conditions say *they will!*

So does the fact that USG sells no makeshifts. Regardless of your process or application, there's a USG Thermometer that suits it precisely. You may choose Industrial Types in all sizes, and mounting forms with standard or protected stems —or Dial Types in a variety of sizes, case styles, mountings, ranges and connections. *All* USG Thermometers—gas, mercury, or vapor-actuated—are built to the same high quality standards as USG Pressure Gauges!

If you're interested in typical applications of commercial and approved Navy Standards, dimensional information and the use of bushings, flanges, sockets and special tubing, send for Catalogs 100 and 200.

Dial Thermometer with bottom-connected rigid stem, one of many USG types available.



Industrial Thermometer of the 45° Recline Form. There are many other standard forms.

UNITED STATES GAUGE

Special thermometers for dough testing, milk testing, fuel gas, candy, solder baths, varnish, canning, vulcanizing and other unusual processes.

United States Gauge
Division of American Machine and Metals, Inc.
Sellersville, Pa.

Gentlemen: We are interested in USG ☐ Industrial Thermometers; ☐ Dial Thermometers. ☐ Please send us your catalog. ☐ Have your man call. No obligation, of course.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

For more facts circle 614 on Reply Card

MAGNESIUM CHIPS

SAND FROM WHEEL PITS

SPENCER VACUUM

IN THE *Metal* INDUSTRIES for

A recovery of tons of babbitt, or pounds of solder flux and gold, or the cleaning of hot pits without waiting for them to cool are essential applications of Spencer Vacuum introduced in the speed-up during the last war. Delicate instruments were bench assembled, inspected and cleaned in half the time, and thousands of products made ready for painting or enameling in minutes instead of hours.

Withall, the same machine improved the sanitary conditions of busy plants and removed bulky materials from floors and dangerous dusts from pipes, ceilings and walls.

There are more than 100 essential industrial economies illustrated in Spencer Bulletin No. 144—yours for the asking.

BENCH CLEANING
METAL RECLAIMING
MILLING CHIPS
SOAKING PITS
SUMP CLEANING
TANK CLEANING
TIN PLATE CLEANING
WELDING FUMES AND FLUX AND
ALL AROUND SANITATION

SPENCER 1½ H.P. INDUSTRIAL PORTABLE 427-B

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER HARTFORD

For more facts circle 615 on Reply Card

NEW PRODUCTS

(Begins on page 128)

tective coating when shells require temporary storage between draws. Applications for X-60 in drawing operations include all conventional metals from 1010 low carbon steel to stainless, also non-ferrous metals. (Further information offered—circle No. 45 on Reader Service Card.) The Mettaloid Corp.

46—SPRAY GUN designed for new epon resin paints

A catalyst is mixed with the paint a split second before it strikes the surface, when sprayed from this new type gun. This blending of paint and catalyst is accomplished with a dual-feed head. Because of the speed with which the paint sets up after the catalyst is added, the two are blended after they leave the gun. Correct balance between the two is of importance —and it is on this point that the new gun is claimed outstanding.

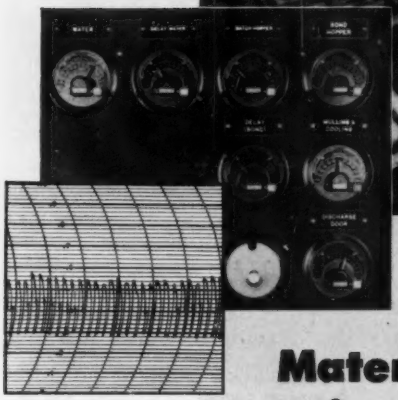
It is essentially a heavy-duty production gun with a precision catalyst feed

system added, and the exterior location of the catalyst nozzles lets the operator watch the flow of catalyst. The hook-up consists of the gun, an air line, and lines for paint and catalyst, pressure tanks for paint and catalyst, gages and fittings. The same air pressure is used on both tanks and all fittings have standard pipe threads.

The catalyst painting system is being used on exterior steel structures exposed to abrasion, weathering and airborne chemicals. (Circle No. 46 on Reader Service Card.) Binks Mfg. Co.

47—CONTROL VALVE for high flow, quick cleaning

Saniflo, a new two-way valve engineered specifically for the sanitary control of food processing operations, is designed to offer the high flow capacity of an expanded "streamlined flow" body and the friction-free power of company's Stabilflo diaphragm motor. It is also said to be quickly disassembled for cleaning. Valve parts exposed to product are made of a corrosion-resistant stainless steel, and the one-piece stem and plunger eliminates threads and crevices.



Factors in this system are timing-cycle control panels and up-to-the-minute graphs of operations.

Knight-Engineered

Materials Handling System Brings 33⅓% Increase in Production Per Man-Hour

for Automotive Parts Manufacturer

Experienced Knight engineers, working with the client's staff, have installed a materials handling process that provides in-line flow of materials in process—without back-tracking. This system has increased man-hour productivity ⅓—reduced floor space ⅓—improved quality control—and lowered unit cost.

The Knight organization of engineers and architects have a broad background in almost every industry. Knight services include:

plant layout • plant design • construction management modernization • mechanization • materials handling • production and cost control • wage incentives • organization • management

If you are interested in any or all of the Knight services, call or write our Chicago or New York office for immediate attention.

EVIDENCE OF EXPERIENCE

Lester B. Knight & Associates, Inc.

Management, Industrial and Architectural Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.

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For more facts circle 616 on Reply Card

What is 100% Safe?

Anything less than 100% safe is 100% UNsafe.

This fellow's lucky, in a way. He *thought* his safety valves were 100% safe, and because they weren't, they might have killed him. Because those valves were *almost* safe, it's going to cost someone a lot of money.

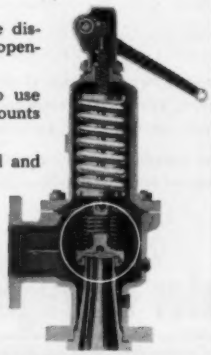
There's only one way to think of safety—think in terms of 100% or nothing. There's one sure way to *get* 100% safety—specify BalanSeal or FarriSeal Valves.

Why? Because they *can't* stick, plug or corrode. Critical working parts are permanently isolated from any contact whatever with the lading.

Because they're unaffected by back pressures in the discharge manifold due to its own operation or to the opening of other valves in the line.

Because these features make it possible for you to use smaller discharge piping, an economy which often amounts to substantially more than the cost of the valves.

You'll be interested in the engineering of BalanSeal and FarriSeal Valves—design which is rapidly gaining acceptance in hundreds of successful installations.



Ask for our "8-Minute Brief."

Your Safety's REAL With FarriSeal

Farris ENGINEERING CORP.

416 COMMERCIAL AVE., PALISADE PARK, N. J.

For more facts circle 617 on Reply Card

NEW PRODUCTS

(Begins on page 128)

To clean, the operatof simply snaps the quick-disconnect clamp, removes the body and loosens a hand nut to remove the plunger stem. Neoprene O-ring seals are used between body and bonnet, bonnet and valve stem.

The high capacity of this valve allows greater flow of product, even in viscous service such as processed cheese, chocolate liquor and cream style corn. Standard line sizes 1 through 3 in. are available. (For complete technical information circle No. 47 on Reader Service Card.) The Foxboro Co.

48—WELDED LINERS offer resistance to corrosion

Corrosion-resistant tank liners made of Agilene (polyethylene) and Agilide (unplasticized polyvinyl chloride) are announced. Of fully welded construction, the liners are made to user's specifications and can be furnished complete with drain and overflows, including pipe flanges, fittings and valves.

The chemical inertness of Agilene and Agilide and the welding method employed are said to provide a leakproof liner for storage, make-up and plating tanks. (For further data on liners circle No. 48 on Reader Service Card.) American Agile Corp.

49—FLOOR PATCH goes on easily and dries fast

Superset Tampatch is described as highly applicable wherever it is necessary to repair floors without loss of productive time. Essentially, all that is needed is to clean and bond the surface to be tamped, dump in the material and tamp into place. The patched aera may be placed in service almost instantly, company says, the patch becomes smooth with moving traffic, and will stand heavy loads.

This patching material is made of specially prepared aggregates coated with fast-drying synthetic resins and combined with asphaltic oils. It is shipped in drums, ready to use and keeps indefinitely when container is kept air tight. The bonding material is packed separately. (For more details circle No. 49 on Reader Service Card.) United Laboratories, Inc.

50—REGULATING VALVE for stream dividing jobs

Suggested for any stream dividing of gases, air, salt water, oil and mild chemicals to 125 psi, this valve is available in cast aluminum, steel or Navy bronze. Bronze and steel models are cadmium plated. The valve design is said to incorporate good plug valve principles and O-ring sealing. And recent tests are reported to indicate minimum pressure drop and full pipe orifice flow characteristics in the 2 in. size now produced. (For detailed information circle No. 50 on Reader Service Card.) Ardee Mfg. Co.

You can't stop an elephant with a sling shot

You can't stop corrosion with ordinary paints...

it takes BITUMASTIC COATINGS!

CORROSION can't be stopped by ordinary paints or conventional protective coatings . . . they can't protect surfaces against the ravages of rust for any appreciable length of time.

But Bitumastic® Coatings can!

FIRST — Unlike maintenance paints, Bitumastic Protective Coatings are specially formulated from a coal-tar pitch base* that is, for all practical purposes, impervious to water. And when you keep moisture away from an exposed surface, you *stop* corrosion.

SECOND—Bitumastic Coatings provide an extra-tough, extra-thick barrier against corrosive elements — a barrier that is impenetrable.

THIRD—Bitumastic Coatings provide up to 8 times the film thickness of conventional paint coatings.

FOURTH —Bitumastic Coatings stop corrosion caused by moisture—acid fumes — alkaline fumes — corrosive soil—salt air—heat.

**Hi-Heat Gray contains heat-resistant metallic base.*

There are 6 Koppers Coatings—formulated to control corrosion of metal and deterioration of concrete. Use the coupon for full information.

SEND FOR SET OF FREE BOOKLETS!

Koppers Company, Inc.
Tar Products Division
Dept. 1123-T, Pittsburgh, Pa.

Please send me, without charge or obligation, your booklets on corrosion prevention.

Name.....

Address.....

City.....Zone...State.....

KOPPERS BITUMASTIC PROTECTIVE COATINGS
REG. U.S. PAT. OFF.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 1123-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

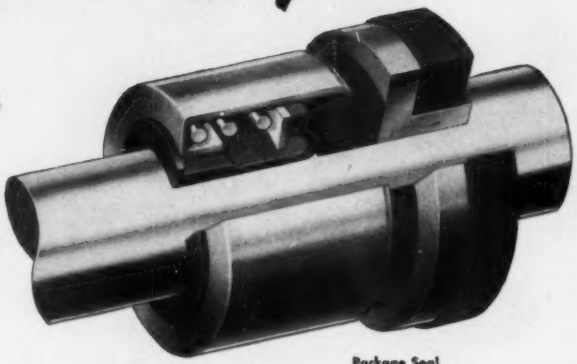
For more facts circle 618 on Reply Card

Garlock Mechanical Seals Save 3 Ways!

1. REDUCE LEAKAGE OF COSTLY OR HAZARDOUS LIQUIDS ON ROTATING SHAFTS

2. NO WEAR ON SHAFT OR SHAFT SLEEVE

3. LONG LIFE WITH LESS PRODUCTION LOSS AND LOWER REPAIR COST



Package Seal

It is most economical to use Garlock Mechanical Seals whenever *leakless* operation of rotary shafts on pumps or other equipment is required.

Once the proper Garlock Mechanical Seal has been installed on a rotary shaft you can forget about leakage. A leakless seal is provided by a positive contact between carefully lapped metal-to-carbon or metal-to-metal mating surfaces.

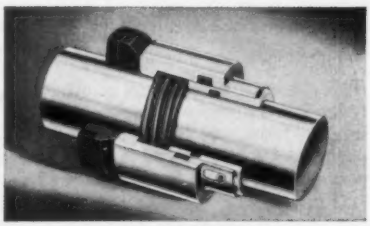
Garlock Mechanical Seals are recommended for use on rotating shafts against practically any liquid including strong acids. All metal parts are available in a variety of corrosion-resistant materials.

The CHEVRON* Seal, for pressures up to 200 p.s.i., and the "O"-Ring Seal, for pressures up to 1000 p.s.i. and over, are individually engineered for each application.

The Package Seal is a low-cost, production-run seal for pressures up to 150 p.s.i. Package Seals of standard construction (brass case and brass washer) are stocked at the factory, for shafts size ⅜″ to 2″, advancing by sixteenths, and for shafts size 2″ to 3″, advancing by eighths.

For complete information write for our Mechanical Seal Booklet or ask your Garlock representative.

CHEVRON* Seal



"O"-Ring Seal

*REGISTERED TRADEMARK

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS

For more facts circle 619 on Reply Card

NEW PRODUCTS

(Begins on page 128)

178—HARDNESS TESTER is low in cost, pocket sized

This portable instrument is for determining hardness of steel alloys and other metals in the range of from 25 to 65 Rockwell C scale. It can be carried in the pocket on the job and may be used to test specimens of steel alloy in almost any position. It is direct reading.

Included in the set is a microball indentor, a measuring microscope and a standard hardness test block. It operates by means of an impact indentor which drives a $\frac{1}{8}$ in. tungsten carbide ball a short distance into the sample to be tested. The diameter of the indentation is then measured by the reticulated microscope. As the diameter is a function of the hardness, the reticle indicates the hardness directly.

Said to be particularly adapted for testing all parts of large dies, punches and large welds as well as for structural steel and large pipes in position, the unit is announced at $69.00 net. (For data circle No. 178 on Reader Service Card.) Pacific Transducer Corp.

179—ROTARY SNOW PLOW is self-propelled, powerful

Operating on the same principle as the large rotary units, the Jari Jr. Rotary Snow Plow is designed to clear 4500 sq ft and handle up to 18 tons of snow per hour. It's described as light in weight, yet powerful. A rotary rake breaks up the snow, which is thrown through a carrying chute and a path 16-in. wide is cleared in one pass.

The plow has a two-wheel drive, semi-pneumatic rubber tires and an independent clutch to permit starting the four cycle engine without load. Extra attachments are available for converting the plow for use as power scythe and power mower. (For details circle No. 179 on Reader Service Card.) Jari Products, Inc.

180—PANELBOARD is dust tight, weather resistant

The new type DTP is a cast aluminum panelboard which will accommodate up to eight three-pole 100-amp 600-v circuit breakers, and is announced as the first panelboard consisting of a single enclosure suitable for circuit breakers larger than 50 amp, 250 v.

The rectangular enclosure has gasketed cover and dust-tight weather-resistant external operating mechanisms for the circuit breakers, manufacturer points out, and these mechanisms are so constructed that they can be made to engage the circuit breaker handles after the cover is installed to eliminate need for positioning them beforehand. The board can be arranged for top or bottom feed and enclosure walls are thick enough to permit drilling and tapping for branch conduits in the ends or sides. (For data circle No. 180 on Reader Service Card.) Crouse-Hinds Co.

- Conductor doesn't have to be centered for accuracy, (toroidal wound transformer)
- Pocket-size, belt-mounting
- Covers 9 ranges
- Probe jaws completely insulated
- Test lead plug insulates itself when removed from meter
- No-rim window floods scale with light

only
AMPROBE
has these features!

AMPROBE "600"
0-15/30/60/150/300/600 amps A-C
0-150/300/600 volts A-C
$59.50 complete with cowhide case and voltage test leads.

AMPROBE "1200"
to 1200 amps A-C
$67.50 complete

AMPROBE "300"
to 300 amps A-C
$49.50 complete

Measures current instantly without interrupting service

PYRAMID INSTRUMENT CORP., LYNBROOK, N. Y.
(Export Div.: 458 Broadway, N.Y.C.)

AMPROBE®

the only pocket-size snap-around volt-ammeter

WRITE TODAY:

PYRAMID INSTRUMENT CORP.,
Dept. PE 112, Lynbrook, New York

Send Bulletins describing

☐ Amprobe Models 600 & 1200

☐ Amprobe Model 300

Name_____

Company_____

Address_____

City_____ Zone____ State_____

For more facts circle 620 on Reply Card

Refrigeration

(Continued from page 126)

contents back into the absorber, to remove moisture and increase ammonia quality. Purging is necessary when the generator liquid level is below normal, or a heavy frost is being carried to the absorber, or the evaporator pressure is lower than it should be for the temperature of the outgoing brine (in brine cooler), or if there is reduced capacity not attributed to any other cause.

With the system operating, close the expansion valve, open the evaporator purge valve, and then close the return gas line valve from the evaporator. Closing the latter valve raises the evaporator pressure, thus raising the liquid to the absorber. The evaporator pressure should not be allowed to rise above 40 or 50 lb. The expansion valve may be opened slightly, if necessary, to obtain sufficient pressure. After purging, the return gas line valve should be opened, the evaporator purge valve closed, and the expansion valve reset to original position.

To reduce pressure in the evaporator, purge the evaporator as explained. When the evaporator becomes empty, close the evaporator purge valve, open the return gas line valve, and let the system operate until the evaporator pressure drops to a vacuum, then close the return gas line valve. If the pressure fails to drop lower than a couple of pounds due to non-condensable gases in the absorber, however, the absorber should be purged as previously explained.

Pressure may be reduced in the rectifier by closing the shut-off valve in the warm gas line between the generator and rectifier and the valve in the line between the separator and generator. Then reduce the condenser pressure as previously explained, except that the valve in the gas line between the rectifier and condenser should be open instead of closed.

To remove strong liquid from the rectifier, close the valve in the pump discharge line between the pump and rectifier and the valve in the pump discharge line between the rectifier and exchanger. Then drain the liquid into a drum, by opening the drain valve slowly until it is wide open and opening a flange union at the top of the rectifier to provide a vent, if necessary.

Strong liquid may be removed from the exchanger by closing the valve in the pump discharge line between the rectifier and exchanger and the valve in the same line be-

Let the Bradleyman Help You Modernize or Enlarge Your Washroom Facilities

Where space is limited, Bradley semi-circular Washfountains will meet requirements. Each serves 4 to 6 persons. Foot-control and self-rinsing bowl provide the utmost in sanitation and prevent water waste.

● The Bradleyman draws upon the experience gained by serving an ever-widening group of Bradley users for over 30 years. His practical suggestions for washroom layouts and use of Bradley group-washing fixtures can help you find the most economical way to provide adequate facilities in a minimum of space.

Bradley 54" Washfountains accommodate 8 to 10 persons simultaneously—replace 8 to 10 single-person basins. Piping connections are reduced 80% and one sprayhead replaces as many as 20 faucets. Maintenance and water consumption are reduced sharply. Foot-control stops contagious washbasin contacts and promotes a new high in employee health and safety. BRADLEY WASHFOUNTAIN CO., 2371 W. Michigan Street, Milwaukee 1, Wis.

Illustrated Catalog 5204 sent promptly on request.

BRADLEY washfountains

Sold Through Plumbing Wholesalers

For more facts circle 621 on Reply Card

Rural Fixtures Save Time

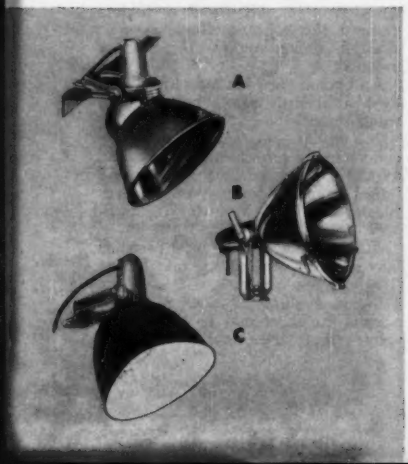
THESE RURAL-TYPE mail boxes, one for each plant department, do more than just grace the exterior of the plant at Kaiser Steel Corp., Fontana, Calif. Mail is delivered around plant grounds via mail car. Department people pick up mail just like they do down on the farm. It saves a lot of time and the mail man doesn't have to go from office to office; doesn't even get out of his car.

BEFORE manufacturer extended work day to two-shift operation this large outdoor area was used for storage only. But . . .

AFTER 24 G-E heavy-duty floodlights were installed in the outdoor yard, increased illumination and better visibility brought . . .

'Round-the-clock daylight for easier more efficient materials handling . . .

A LIGHT FOR EVERY NEED is available from G.E.'s full line, for example: A High efficiency, lightweight, easy-to-install area floodlight for crossarm mounting, wide three beam spreads; B Heavy-duty, wide variety of mountings and beam spreads; C Inexpensive, open floodlight for closer-range illumination.



AND EUCLID ROAD MACHINERY CO. DOUBLED USE OF STORAGE AREA

To complete their new plant-wide, two-shift operation, the Euclid Road Machinery Co., large manufacturer of equipment for moving rock, ore, and earth, installed G-E floodlighting in its outdoor storage area. Now, their assembly lines are fed an uninterrupted supply of materials quickly and efficiently, at night as well as during the day.

MORE SAFETY, MORE PROFIT. "Workers appreciate the extra safety and more pleasant working conditions afforded by G-E floodlighting. It enables them to handle materials with minimum damage and confusion, bringing maximum speed and profit to our operation," says D. L. Lawrence, Plant Engineer.

LOW COST. An investment in outdoor lighting is insignificant compared to either your present investment in outdoor work areas or the increased productivity which G-E outdoor lighting achieves for you.

FOR INFORMATION on how you can make storage areas usable at night, speed the flow of materials along plant roadways, or facilitate work at loading docks and platforms with G-E outdoor lighting, write for bulletin GEA-3640, to Section 451-175, General Electric Company, Schenectady 5, N. Y.

OUTDOOR INDUSTRIAL LIGHTING

GENERAL ELECTRIC

tween the exchanger and generator. Drain liquid into drum as explained for rectifier.

To remove weak liquid from the exchanger, close the valve in the weak liquid line between the generator and exchanger and the valve in the same line between the exchanger and the weak liquid cooler. Drain liquid as explained for rectifier.

Weak liquid may be removed from the weak liquid cooler by closing the valve in the weak liquid line between the exchanger and weak liquid cooler and the valve in the same line between the weak liquid cooler and absorber. Drain liquid as explained for the rectifier.

Liquid ammonia containing not more than ½ of 1 per cent moisture is considered dry or anhydrous; that containing more than this percentage is considered wet.

If the liquid is sufficiently wet to affect the capacity of the system, the cause may be a leak in the rectifier, excessive generator steam pressure, generator ammonia liquid level being carried too high, or ammonia separator being filled with condensation.

Where the evaporator is employed to cool brine, freezing of the brine may occur. Since the accumulation of anhydrous liquid ammonia in a frozen evaporator may become sufficient to be dangerous, great care is necessary in thowing out the evaporator. Sufficient gas space in the top of the evaporator must be provided at all times to take care of expansion of the liquid.

When thawing an evaporator, be sure that the valve in the evaporator purge line to the absorber is wide open. Then close the expansion valve, and close the valve in the return gas line from the evaporator slowly. Carefully note the gauge pressure.

Next open the expansion valve gradually and until the evaporator pressure rises sufficiently to purge liquid out of the evaporator and raises the liquid ammonia temperature above the brine freezing temperature. During this time have full brine pressure on the evaporator. When the brine circulation becomes normal, open the valve in the return gas line from the evaporator, shut the evaporator purge line valve, and then reset the expansion valve to original position.

Ammonia leaks may be detected by odor or by use of a sulfur taper, which produces a white smoke in the presence of ammonia.

To detect ammonia in cooling water, generator condensation, etc., litmus paper may be employed. White litmus paper will turn red when in contact with ammonia.

Brine will turn litmus paper red whether or not ammonia is present. Therefore, a very little granulated caustic soda should be added to about a half-cupful of brine and dissolved and mixed well, being very careful to avoid burns, especially of the eyes. Cover the sample with a piece of window glass. Moisten a small piece of white litmus paper and attach it to the underside of the glass, being careful that the litmus paper does not touch the brine mixture. Of course, the testing area must be free of ammonia fumes.

If after 5 minutes the paper has not turned red from the vapor coming from the sample, ammonia is not present in the brine.

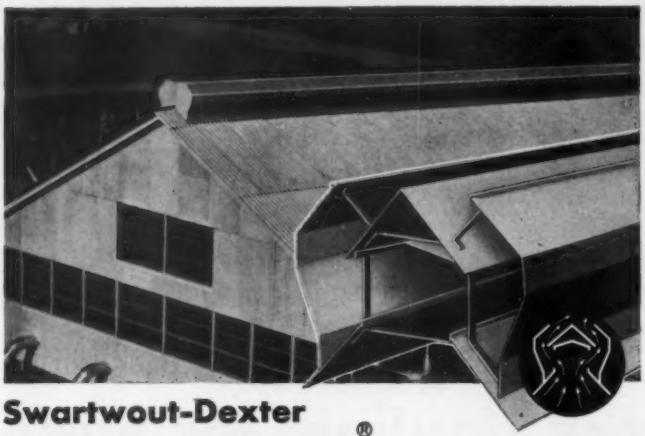
A leak in the exchanger will cause high absorber pressure and low condenser or generator pressure. A strength test will show a higher strength weak liquid, the degree of strength depending on the size of the leak.

An exchanger leak may be caused by insufficient stuffing box packing ring pressure.

A rectifier leak will cause a low condenser or generator pressure, and may be detected by testing the liquid ammonia for moisture with a special test bottle used for the purpose.

A leak in a double pipe rectifier may also be caused by insufficient packing ring pressure.

If the system capacity is below normal the cause may be insufficient water supply, generator steam pres-



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provides simple, practical ventilation for your industrial buildings of all types

"Heat Valve" as originated by Swartwout and installed throughout industry on almost every type of building means economical, efficient *natural flow* ventilation. As a continuous opening it is particularly popular for ridge ventilation on peak roofs or for sawtooth construction. But it is equally efficient in shorter sections, on flat or slope roofs or on skylights.

Heat Valve design features short air travel with minimum friction; compact design; effective adjustable damper control. It supplies large air-moving capacity per square foot of opening—at economical cost. Completely weatherproof. Made in 10 standard throat sizes. Write for Folder 336D

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The Swartwout Co.

Roof Ventilators and Ventilating Louvers

POWER PLANT EQUIPMENT • PROCESS INDUSTRY CONTROLS

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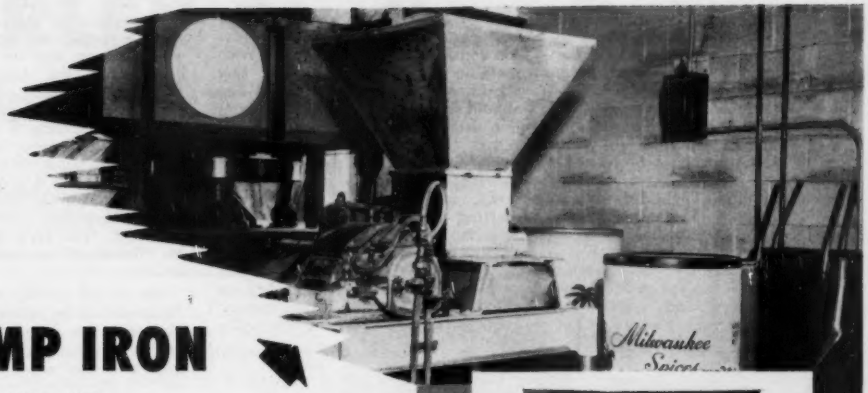
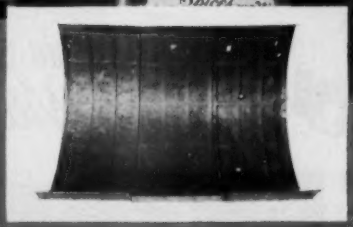


TRAMP IRON

hurled by a Spice Mill operating at 6800 r.p.m. . . .



ruined a lot of screens (approximate replacement cost — eighteen dollars) in a Milwaukee food processing plant . . .

until a DINGS PERMA®-PLATE non-electric, guaranteed permanent-MAGNET was installed at the base of the hopper that fed the mill (note nails, wire, bolt held on slide) . . .

This powerful magnet traps and holds tramp iron in its field until the mill is cleaned at the end of an operating cycle.

This is one of the many ways food processors are using DINGS PERMA®-PLATE MAGNETS to protect their processing equipment — purify their products. For more information on this powerful, certified permanent magnet write for catalog C-1205-A.

Rout tramp iron from your processing flow with a "JOB-SELECTED" MAGNET by Dings.

PP-1

Perma®-Plate Magnet

Magnetic Pulleys

Enclosed Drum Unit

Dings

MAGNETIC SEPARATOR COMPANY

4766 W. ELECTRIC AVENUE, MILWAUKEE 46, WIS.

For more facts circle 624 on Reply Card

sure or ammonia charge. Or it may be due to non-condensable gases in the high or low pressure side of the system, dirty water surfaces in the condenser, absorber and weak liquid cooler, excessive moisture accumulation in the evaporator, failure of ammonia separator to drain back to generator, leak in the exchanger or rectifier, worn pump rings in ammonia cylinder, or, in brine cooling, weak or insufficient brine charge or insufficient brine flow.

If the ammonia pump becomes air or gas bound, close the suction and discharge valves and purge the cylinder into a bucket of water.

Where soft packing and the water box are employed, no ammonia piston rod lubrication is required. With metallic packing, the water box should not be used, and an oil cup should be provided to drop about one drop of oil per minute on the rod.

The ammonia rod packing should be tightened slightly after shutting down, and loosened again before starting up. This is very important if pump trouble is to be avoided.

To repack the ammonia end of the pump, see that the metal split ring is in the back of the stuffing box, as shown in Fig. 3, then install enough rings of packing to fill the box within one inch of the end. Slip the second metal ring against the last packing ring, and the gland against the metal ring, screwing up the gland nut by hand only. The gland sets against the packing where no second metal ring is used.

After the pump has run for a short time, slack off one turn of the gland nut every 4 or 5 hours to permit expansion of the packing and avoid damaging both the packing and rod. The packing should only be tightened enough to prevent leakage.

As shown in Fig. 4, the packing rings should be placed on the pump rod with the joint above the horizontal center on alternate sides. Do not place any joints below the center.

Air Circuits

(Continued from page 93)

into the fixture. He then presses valve A. Air is fed to the top of cylinder B, a double-acting cylinder which controls vertical movement of spindle G. Rack C is geared to move with the spindle. The rack has two adjustable cams identified on the photograph as 1 and 2. As the rack moves downward with the spindle, cam 1 releases valve D which sends air to cylinders E. The rods of these cylinders have clamping heads, F. Air to cylinders E closes the clamp onto the workpiece in the fixture and holds it firmly.

Length of reamer stroke is predetermined. The stroke is controlled in the air circuit by the spacing of cam 2.

Cylinder B will continue to feed the reamer downward until cam 2 strikes cam 3. Cam 3 releases valve H which reverses the entire cycle. Air is introduced to the underside of Cylinder B, the reamer withdraws, and when cam 1 strikes valve D, the clamps of cylinders E retreat.

The operator then taps ejector knob J, places the finished product into one container, takes a workpiece from another container, and loads the fixture.

While one machine is being loaded, the other is going through the reaming cycle. Operator's movements are confined to loading and tapping valve and ejector knobs.

The air circuits and fixtures are arranged with the ejector knobs facing in to reduce operator movement to minimum.

Air pressure for the circuit is regulated betweeen 40 and 60 psig; pressure during downstroke being somewhat higher than for the return stroke. Water trap and lubricator are placed in the lines. With exception of the rubber hoses to cylinder B, all lines are copper tubing which can be easily bent to shape. Photos and data courtesy Compressed Air and Gas Institute.

For fast, sure, low-cost production it's *Richards-Wilcox* CONVEYORS

Efficiency—that's a word that means faster production, more profits for you. And efficiency is the word for Richards-Wilcox Conveying Equipment. R-W Conveyors speed up production by cutting down on handling time and releasing plant personnel for other jobs.

There's an R-W Conveyor for industry of all types—for handling of light, medium and heavy materials. You can boost production, cut costs and increase efficiency with Richards-Wilcox Conveying Equipment. Why not have an R-W consultant show you how you can lick your production problems with conveyor equipment engineered exactly to your own particular requirements. Just write or phone the nearest R-W branch office for free consultation—there's absolutely no obligation.

One of These Installations is Right for You

"ZIG-ZAG" Continuous Power Conveyors—Unique powered chain conveyor with extreme flexibility. Designed especially for carrying light loads within confined areas—handles products through degreasers, dip tanks, spray booths, ovens, etc., (shown above).

"LOCK-JOINT" Trolley Track OveR-Way Conveyors—Designed for handling light to medium loads, and maximum flexibility. Maximum capacity 3,000 lbs.

"TRU-TRED" Steel Beam OveR-Way Conveyors—For heavy duty handling and electric hoist service with minimum superstructure—eight different track sizes. Maximum capacity 8,000 lbs.

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MARLEY Cooling Towers
Dominate the Medium-Capacity Field

. . . and that dominance has been earned by more than 25 years of offering a broad selection of the best equipment for each installation. The scope of Marley engineering ability and production facilities permits the buyer to select the tower that is right for his job . . . right in type, right in size and right in performance. This leadership is maintained by constant specialized research that keeps Marley towers modern to the minute.

Double-Flow Aquatowers, newest of all cooling towers, typify Marley design advancement. They offer every advantage of Marley patented cross-flow cooling and reduce usual tower height up to 66% in any capacity model. Produced in all-steel or wood with asbestos cement board casing, these towers in just six months have achieved remarkable popularity with engineers responsible for power and plant operations.

For larger capacity installations the Marley conventional counter-flow is the standard in industry for process cooling and refrigeration. Its design embodies the many exclusive improvements Marley has originated for this type tower. They are constructed of all steel, all wood, steel frame with asbestos cement board casing, or wood frame with asbestos cement board casing.

*Registered trade name.

● Marley conventional cooling tower. May be built in multi-cell units for added capacity.

● Marley Double-Flow Aquatower, newest of all towers, harmonizes with modern architecture and is available in eight size models.

Mechanical equipment for all Marley cooling towers is designed and manufactured by Marley. These fans, Geareducers and drives are all engineered for cooling tower service exclusively. They are precision built with added sturdiness to do the job . . . well and long.

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The Marley Company, Inc.

KANSAS CITY 5, MISSOURI

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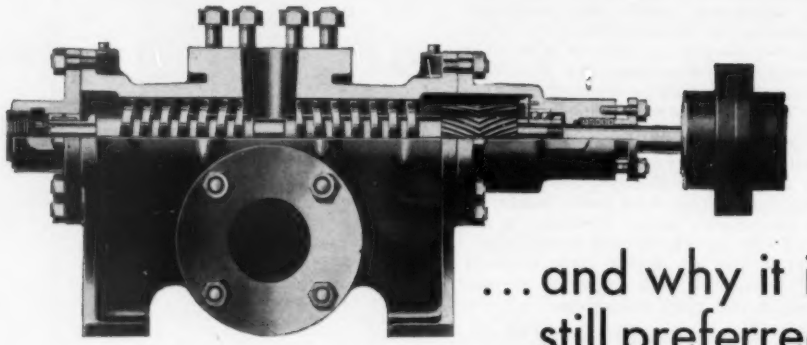
QUIMBY

...the Original Screw Pump



...and why it is still preferred

100% Anti-friction bearing equipped. Due to their rolling action and minimum lubricating requirements, anti-friction bearings maintain their original clearances without appreciable wear. No hydraulic shock or discharge pressure loads on the bearings because Warren-Quimby Screw Pumps are 100% balanced axially.

Quadruple non-slip screws. A specially generated curvature is now used, producing a straight line contour between screws, essentially eliminating all slippage between these elements. Closer clearances without metallic contact insure higher efficiencies over longer periods.

Balanced power, pulseless discharge. No special foundations or bolting required for successful operation. Smooth running and quiet, with a minimum of churning or foaming of liquid handled.

No stuffing box troubles. In general, there are no packing troubles with Warren-Quimby Screw Pumps. By using sets of opposed intermeshing pumping screws, the flow of liquid is from each end toward the center, insuring suction pressure only on the stuffing boxes.

Herringbone Driving Gears. Smoother flow of power from the driving shaft to the idler shaft is accomplished by multi-tooth, precision cut, full herringbone gears. These gears are so positioned and timed as to maintain a definite clearance between the pumping screw elements.

Positioning Bearing. A fixed ball or roller bearing on the drive shaft effectively absorbs all external thrust loads. This permits full floating screw elements, free to expand at elevated temperatures without harm to the pump.

Interchangeability. All parts, excepting the body and length of screws and shafts, are interchangeable with corresponding sizes in the gear-in-head and external bearing designs.

The most complete line of Screw Pumps in the industry.

Insist upon the original... now owned, manufactured, marketed, serviced and guaranteed by Warren . . . one of America's pioneers of the pump industry. Write for bulletin S-204.

PQ-3

WARREN QUIMBY PUMPS

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC., WARREN, MASSACHUSETTS

For more facts circle 627 on Reply Card

(Continued from page 38)

135 For Faster Nailing—This bulletin introduces a semi-automatic nailer for driving nails from 6 to 16 penny which attaches to any pneumatic hammer with a No. 2 Morse taper. Stresses speed afforded, lessening of fatigue in overhead work, versatility and safety. Fox Nailer Corp.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

137 Concrete Cutter—Form 500A presents the Tri-Line cutter designed to cut concrete faster at lower cost, without spalling. Pictures the cutter at work, gives specifications. Tri-Line Co.

138 For Welding and Cutting—Bulletin 330, 20 pp, pocket sized, presents welding and cutting units to meet a wide range of requirements. Illustrates and describes units for flame cutting, heating and welding. Includes prices. Victor Equipment Co.

139 Machine Tool Conduit — Bulletin CMH-106R gives complete information on machine tool conduit and fittings widely used in automotive plant machinery, chemical processing equipment, other industries as well as on machine tools. Describes construction. Flexonics Corp.

140 Rotary Straighteners at Work—Production experience records on straightening pipe and tubing in seven different plants are compiled in Technical Bulletin 52, 8 pp. Presents in case study form a variety of ways in which rotary straighteners helped solve plant production problems. Covers such subjects as quantities of tubing straightened per shift; increases in production. Mackintosh-Hemphill Co.

PUMPS AND COMPRESSORS

141 Cradle-Mounted Pumps—Sixteen-pp Form 7223, covering general purpose centrifugal pumps of the cradle-mounted type, presents five basic groups and 17 corresponding pump types, their capacities, horsepower ratings and uses. There are also pages on pump dimensions and a table of performance under 60 cycle use. Special purpose units and design modifications are also included. Ingersoll-Rand Co.

142 Chemical Proportioning Pumps — Bulletin 1225, 8 pp, gives latest information on company's heavy-duty Chem-O-Feeders —small proportioning pumps available with one, two or three measuring chambers for capacities to 57 gph and supplied as a "package." %Proportioneers, Inc.%

143 Gas Engine-Driven Compressor — Bulletin 124 is a 50-pp, well-illustrated booklet on manufacturer's HMA Midget Angle compressor available in models of two, four, six and eight cylinders, 80 to 330 bhp. Stressing the flexibility, easy installation of this compressor shows how it meets basic requirements for a semi-portable field compressor and can be supplied as a packaged compressor station and discusses further advantages. Clark Bros. Co., Inc.

144 Heavy-Duty Compressors — Heavy duty package types of company's Feather Valve compressors from 75 to 350 hp are featured in Bulletin L-876-B1 32 pp. Includes an illustrated discussion of the Feather Valve, also frame, running gear parts, cylinder, intercooler, variable capacity control. Worthington Corp.

145 For Oil-Free Air—Featuring a large cutaway illustration Bulletin 600 presents manufacturer's new Oilfreair compressor for use where oil-free compressed air or gas is required. Tells what this compressor is designed to accomplish. Pennsylvania Pump & Compressor Co.

VALVES, TRAPS AND PIPING ACCESSORIES

147 Valve Selection Booklet— Sixteen-pp Catalog 12-H, covering company's Pressure-Seal stop, check and non-return valves, gives descriptive data, design characteristics and dimensional details. Provides tables and charts for easy calculation of pressure drop, as well as complete material specifications including chemical analyses and physical characteristics. Cutaway photos and drawings illustrate the Pressure-Seal construction and company's Equalizer. Edward Valves, Inc.

148 Pneumatic Valve Operator—This 8-pp bulletin explains operating principles and outstanding features of the Rotomotor positioning operator for throttling control service. Tells how this heavy duty, all-pneumatic operator is designed to combine safety, economy, power. Conoflow Corp.

149 Gate Valves—This new 6-pp. catalog section describes a new line of cast steel gate valves. Contains complete information on details of design, material specifications, pressure and temperature ratings, and dimensions and weights. Features described include close fitting guide ribs which prevent wedge drag on seat faces, one-piece bonnets. Edward Valves, Inc.

150 Steam and Air Traps—Twelve-pp Bulletin 213 is a revised edition of company's condensed catalog on traps. Contains a sequence of diagrams explaining operating principle and design features of company's inverted bucket traps. Prices, physical data and other details on cast semi-steel and forged steel steam traps, and ball float air and air-relief traps are included. Data is also given on internal check valves, special traps. Armstrong Machine Works.

151 Expansion Joints—Manufacturer's recently redesigned Flexon line of expansion joints is featured in 16-pp Catalog CMH-128. Complete specifications and other data are given for the new joints, which offer increased traverse per corrugation. Also presented in this catalog is information on corrugated and convoluted types of flexible metal hose. Flexonics Corp.

HEATING

152 Unit Heaters—Up-to-date information on both vertical and horizontal shaft units is provided in brand new Bulletin 3570, 48 pp. Besides describing component parts and dimensions for both style heaters, it provides included expanded steam and hot water capacities. A section is devoted to selection and application, giving mounting height tables, quietness rating tables, and sample heat calculation sheet. Also includes a section on motor controls showing wiring diagrams. Herman Nelson Div., American Air Filter Co., Inc.

153 Low Level Convector Radiators—Catalog 4150, 8 pp, covers convector radiators especially suited for installation beneath low windows. Describes and pictures design features, gives capacity data and specifications. Young Radiator Co.

154 Heat Transfer Equipment—Generously illustrating the containers, fixtures and retorts more commonly used in carburising, annealing, etc., 28-pp Catalog 52 also contains a collection of installation views of new equipment with interesting possibilities for saving handling and heating time. The Pressed Steel Co.

November, 1952

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DUST CONTROL

155 Cloth-Screen Dust Collector—Bulletin 102 describes in detail manufacturer's new Dynaclone dust filter designed primarily for continuous process industries where uniform suction at all dust points is essential. Gives complete engineering data on this equipment, including details of construction, principle and application. The W. W. Sly Mfg. Co.

156 Dust Filters—Sixteen-pp Bulletin 528, dealing with various aspects of dust control, as achieved by company's Hersey-type dust filter, presents a practical approach to dust control problems. Stresses advantages of filters affording a continuous-automatic method of cleaning the filter cloth with high pressure reverse air. Other benefits shown. The Day Co.

METALS

157 Copper and Copper Alloys—Publication B-34 is a 28-pp revised edition of "Copper and Copper Alloy Specification Index." Provides up-to-date specifications of the various national engineering societies and government agencies, including military. The first of its two sections lists most generally used copper alloys together with the applicable specifications of nine different agencies. The second section lists specifications in numeric order with a brief description. The American Brass Co.

158 Hardenable Steels—Two economical ferritic stainless tubing steels having resistance to corrosion and oxidation and ability to be hardened by heat treatment are discussed in Technical Data Card 142. Includes condensed technical data on corrosion resistance, mechanical properties, forging, machining, properties, etc. Tubular Products Div., The Babcock & Wilcox Co.

159 Modern Trends in Gear Materials—Generously illustrated with tables and charts, this literature is presented in two parts, Part I, 20 pp on nickel steel and cast iron, and Part II, 11 pp, on new gear materials. Carburizing and direct hardening nickel alloy steels and low and medium silicon nickel gray cast irons are covered. Machinability and effects of various types of heat treatment are covered. The International Nickel Co., Inc.

INSTRUMENTS, CONTROLS

161 Instrumentation at White House—A description of the ultra-modern graphic control panel for the new White House air-conditioning system is featured in the 40-pp Third Quarter 1952 issue of Instrumentation. Also included are an article on Teflon valve packing, and one on the instrument courses at Case Institute of Technology. Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

162 Electronic Recorders—Bulletin A-704, 6 pp, covering company's Autronic recorders, is generously illustrated with photos, schematic diagrams showing principles of operation, and dimensional sketches. The Swartwout Co.

163 Push-Pull Control Systems—Form AD-311 is a 12-pp manual covering all phases of manufacturer's versatile push-pull control. Illustrated with many photos, drawings and tables, booklet covers construction features, types of installations, design details, principal components and planning data. Simmonds Accessories, Inc.

TEXTILE MILL EQUIPMENT

165 Electrical Equipment for Textile Mills—Stressing savings afforded through the use of modern electrical apparatus, 35-pp Booklet B-4789 describes a complete line of electrical cotton for cotton and rayon mills—from switches to bleaching range drives. Lint-free motors, totally-enclosed motors, and gearmotors are discussed, also packaged-type adjustable speed drives, beamer and slasher drives. Westinghouse Electric Corp.

166 To Prevent Mill Fires—Explaining that tramp iron in cotton is a prime cause of fire and machinery damage in cotton gins and cotton oil mills, Bulletin B-565 describes permanent (non-electric) magnetic separators as an economical means of removing this iron. Eries Mfg. Co.

OTHER EQUIPMENT

167 Self-Locking Nuts—Thin locknuts, 1/3 lower in height, designed to meet or exceed minimum Army-Navy tensile requirements for regular-height locknuts are featured in this new 26-pp catalog covering company's full line of locknuts. The thinner nuts can be used in many applications to save weight, space and assembly time. Sizes, fits, part numbers, dimensions, tensile values and other information are given. Standard Pressed Steel Co.

168 Reference Records—Chaindex, said to be the most compact and adaptable of visible reference records, is fully described and illustrated in 8-pp Booklet ED 574. Shows types and kinds of cards available, tells methods. Remington Rand, Inc.

169 Elevator Dollars at Work—Here's a 16-pp treatise giving an over-all picture of vertical transportation in multi-story buildings, and offering valuable suggestions on service, operation, maintenance and modernization. Interesting examples of big savings in operating costs, as well as examples of losses incurred through costly mistakes are presented. Charles W. Lerch & Associates.

170 Anti-Seize Lubricant — This illustrated bulletin describes in detail the many features of company's molybdenum disulfide lubricant in a wide range of uses wherever extreme pressures are encountered. This product is said to prevent seizing and galling at bearing pressures over 100,000 psi, and lubricate at temperatures from below zero to 750 F. Bel-Ray Co., Inc.

171 Reducing Atmosphere Generators—A high efficiency reducing atmosphere generator is described and pictured in bulletin R-352. Text explains how it is designed to produce more gas in less space at lower cost and with minimum attention. Applications in the metallurgical industry are told, special features listed. Includes tables of operating costs. Gas Atmospheres, Inc.

172 O-Ring Slide Rule—Now available to plant engineers who must determine proper size O rings for various applications is a slide rule data chart covering manufacturer's Series 6227 and Series 6230 O rings. Pocket-sized, and in slide rule form it shows at a glance the size to use. Plastic and Rubber Products Co.

173 Open Flow Nozzle—Bulletin 136-J5, 8 pp, provides pertinent engineering information, including construction dimensions, installation and capacities, of company's open flow nozzle. Tells some applications. Builders-Providence, Inc.

174 Industrial Changerooms—Architectural standards, dimensioning, equipment and safety are emphasized throughout in "The Design and Layout of Industrial Changerooms," a 16-pp illustrated booklet. Several photos are included as well as sketches indicating many of the details in laying out the entire room. The Moore Co.

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DATA FILE of literature for the plant library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided on pages 37-38 and 189-190.

FUEL OILS, LUBRICANTS

201 Cooperative Technical Consultation Service—This 24-pp booklet presents company's periodic consultation service offered to industrial plants and aimed at efficient use of petroleum products. Covers services available in solution of lubrication problems, metalworking operations, processing, fuel and heating oils, dust control. Gulf Oil Corp., Gulf Refining Co.

202 The Why, What and How of Lubricants—This 20-pp booklet explains and illustrates common tests and terms describing lubricants. Covers viscosity, flash and fire, neutralization, number, penetration, specific gravity, extreme pressure, steam emulsion, corrosion. Tide Water Associated Oil Co.

203 Versatile Industrial Oil — Described in 20-pp Form AD 4078 is an all-purpose oil offering protection for a wide range of industrial equipment, and available in 15 viscosity grades. Discusses six major characteristics of the oil; explains and pictures its use in hydraulic systems, speed reducers, air compressors, electric motors, hydraulic turbines, bearing systems, etc. A chart shows grades and uses, physical properties. Standard Oil Co. (Ind.)

204 Lubricant Data Book—This pocket-size 56-pp booklet gives product information and principal uses of approximately 40 lubricants of both grease and fluid types, and general directions for proper application. Discusses lubricants requirements of equipment in 25 major industries. Lubriplate Div., Fiske Bros. Refining Co.

205 Viscosity of Fluids—The larger significance of viscosity is discussed in Nos. 5 and 6, Vol. 36 of Lubrication, a technical publication. Illustrates simplest conception of streamline flow between two surfaces having relative motion. Shows how viscosity is measured. The Texas Co.

206 Colloidal Graphite Uses—Bulletin 435 is devoted to information on company's colloidal graphite use in surface coatings (dry-film lubrication) and impregnation. Graphite provides lubricating properties in the absence of fluid lubricants, and impregnation increases wear resistance of surfaces such as brake drums, clutches, and grinding wheels. Acheson Colloids Co.

PUMPS, COMPRESSORS

207 Centrifugal Pump Handbooks—Two instruction booklets covering installation, operation and repair of company's single-stage angle-suction and multi-stage centrifugal pumps are available. They include illustrated description of such late developments as Magic-Grip couplings, universal joint couplings with Magic-Grip bushings, mechanical seals. Suggest regular inspection procedures and include pages for maintenance records. Also provide handy reference tables explaining how to locate trouble and listing causes and cures. Bulletin 08X7813, 24 pp, covers single-stage pumps; Bulletin 08X7780 48 pp, covers the multi-stage pumps. State choice or both. Allis-Chalmers Mfg. Co.

208 Rotary Pump Service Manual — Although written for users of company's own rotary pumps and including a parts list, this little 20-pp booklet contains tips on installation and care applicable to practically all pumps of this type. Covers mounting, pipe connections, suction lines, pipe sizes, strainers, discharge lines, power, relief valves, speeds. Provides pointers on noisy operation, rapid wear, decreased capacity, loss of suction. Viking Pump Co.

209 "A Turn for the Better"—Bulletin 30-B, 8 pp, discusses manufacturer's improved Moyno pump, explaining in detail its progressing cavity feature and showing how the rotary motion created provides continuous flow at positive pressure. Stresses performance advantages of the pump. Pump Div., Robbins & Myers, Inc.

211 Rotary Pumps — Bulletin WQ-50, 8 pp, describes Warren-Quimby Ilotex pumps, illustrating design features by both sectional and exterior views. Engineering data, selection charts and dimensions are included. Warren Steam Pump Co., Inc.

212 Condensed Pump Data—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications, features and references to specific literature providing further information. Goulds Pumps, Inc.

213 Compressor Selection Chart — Based on normal applications handling air with atmospheric intake pressure, this chart simplifies selection of proper size compressor, giving quick comparison between discharge pressure pounds per square inch gage and piston displacement cubic feet per minute. The chart shows recommended compressor bore and stroke in inches. Worthington Corp.

214 Multi-Stage Compressors — Featured in 36-pp Bulletin 116 is a presentation of engineering data and performance characteristics to enable plant engineers to approximate power requirements, rotative speed and discharge temperature for most multi-stage centrifugal compressor applications. Clark Bros. Co., Inc.

PACKINGS

215 Metallic Packing—This folder is devoted to company's elastic metallic packing intended for frictionless operation by means of an oil seal. Photos and text tell how seal is constructed, operates and is used. A. W. Chesterton Co.

216 Data on Packings—Form 428 is a collection of bulletins on flexible metallic packing, semi-metallic packing, rotary mechanical seal, oil pressure system and steel packing tools. Durametallic Corp.

217 Braided Rod Packing — This 8-pp bulletin outlines advantages of company's lattice-braid rod packing. Contains sectional drawings, showing their unique structure, illustrations of types available, tables of service recommendations, specification and reports from users. The Garlock Packing Co.

218 Long Wearing Piston Packing—Form 4502, 8 pp, presents composition cups for packing pistons of air and hydraulic cylinders and reciprocating pumps. Engineering information covers properties, textures, temperature and pressure data, sizes. Darling Valve & Mfg. Co.

219 Buyer's Guide on Packings—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Greene, Tweed & Co.

INSTRUMENTS, CONTROLS

220 Fundamentals of Instrumentation—Booklet 80-2, just released, offers 128 pp of information on instrumentation in industry. Separate sections are devoted to the fundamentals of measurement and control, measurement of process variables, remote transmission of measurements, automatic controllers, power units and final control elements, control systems and panelboards. Illustrated. Available to qualified plant engineers. Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

221 For Liquids Worth Storing—Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage. Stresses value of measuring stored liquids. Liquidometer Corp.

222 Time Saving Volt-Ammeter—Manual 110, 16 pp, "How to Make Your Job Easier with the Amprobe," describes the handiness of this pocket-size volt-ammeter in installing, repairing, servicing electrical equipment. Pyramid Instrument Corp.

223 Electrical Instruments — A line of instruments for production testing, plant maintenance and service is shown in 16-pp Bulletin A-16-B. Among these are a-c clamp volt ammeters and a-c clamp ammeters, circuit testers, analyzers, mutual conductance tubechecker, pocket-size meters. Weston Electrical Instrument Corp.

224 Gages for Many Jobs—Sixty-eight pp of liberally illustrated information is offered in Catalog 64. Describes a variety of gage types; air volume controls for pump installations, vapor tension thermometers, d-c ammeters and voltmeters, and water flow meters covered. Includes engineering tables. United States Gauge Div., American Machine and Metals, Inc.

225 Handbook on Automatic Controls—Catalog 700 provides 45 pp of ordering and application data on automatic controls with mercury contact switches. Covers control equipment for temperature, pressure-low water, liquid level, bottles; transformer-relays, valves. The Mercoid Corp.

226 Wide Range Regulator—Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works. The Powers Regulator Co.

ELECTRICAL

227 Buyers' Manual on Motors and Control—Fifty-pp Catalog GEC-1000 presents buying information on a carefully selected group of motors, motor starters, control accessories and electronic control. Ratings listed are those most frequently required. Excellent selection data, dimensions, ratings and prices. General Electric Co.

228 Motor Panorama—Motors and generators—about 50 types in all—are pictured in Publication AEB 100.8B, which serves as a handy reference, since it lists specific literature dealing with each motor shown. Gives general construction details of each unit. Fairbanks, Morse & Co.

229 Enclosed Motors—Construction features and details of totally-enclosed, fan-cooled motors with tube-type air-to-air heat exchangers in ratings from 40 hp at 600 rpm through 800 hp at 3600 rpm are described in Bulletin 51B749B. Points out that these motors come in standard and explosion-proof designs, the former for applications without explosion hazards but requiring protection from dust, fumes. Allis-Chalmers Mfg. Co.

230 Motor Control—A handy reference book on modern motor controls, comprises 76 pp of condensed information, dimensions and prices of the most popular items in company's line. Covers a-c manual and magnetic across-the-line switches; a-c voltage starters, control relays and contactors; synchronous and high voltage starters; d-c control relays, contactors, starters; drum switches, a-c d-c rheostats, speed regulators, etc. Allen-Bradley Co.

231 Bus Duct Manual—Booklet B-4272A, 68 pp, on bus duct and accessories, presents application and test data, specifications, information on pricing a typical installation. Describes advantages of bus duct for a secondary power distribution system, carrying current from transformers to switchgear—and from there to motors, etc. Westinghouse Electric Corp.

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232 Plug-In Power — Sixty-pp Catalog 25 offers real help on electrical installation problems involving portable tools, materials handling equipment, cranes, hoists, cutting equipment. Covers a prefabricated trolley busway electrical distribution system to provide outlets for power or light where needed. Feedrail Corp.

233 Weatherized Motors — Six-pp Bulletin 400 describes company's All-Weather integral motors for industrial use. These have full height protection, through ventilation, one-piece steel shell, interchangeability of end head. Robbins & Myers, Inc.

234 Power Distribution Feeders — Catalog TEB-1, 40 pp, on heavy-duty units for main feeders in distribution systems, gives construction, engineering, application data. Trumbull Dept., General Electric Co.

235 Distribution Duct Engineering Data —Bulletin 427-4 contains 32 pp of data for estimating ventilated duct for feeder, circuits, plug-in duct, and plug-in duct for branch circuits. Includes instructions for laying out distribution duct jobs, and pointers on estimating diagrams, layout symbols. BullDog Electric Products Co.

236 Retractile Cords—Bulletin KKG describes and pictures some of the applications for permanently coiled, neoprene jacketed electric cords which expand to 5 times retracted length. Koiled Kords, Inc.

237 Power and Control Cables—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

238 Thermal Fuses—Folder 482-ST on company's Saf-T-Lag thermal fuses explains what these triple-action fuses are designed to do and how they operate. Jefferson Electric Co.

239 Overload Relays — Bulletin 1180-3 is a technical data sheet on overload relays designed to combine advantages of thermal and magnetic tripping characteristics for protecting a-c motors. Pictures design details. The Electric Controller & Mfg. Co.

240 Battery Technology Handbook—This is a 56-pp revised edition of company's manual of technical instruction and engineering data on the care of motive power storage batteries. Major addition is a section on charging, which includes information on modified constant voltage and two-rate charging, boost, equalizing and emerging charging, control of discharge, etc. Other sections cover the theory of the lead-acid battery; practical tips on care and operation; maintenance and repair. Gould-National Batteries, Inc.

241 Preventive Maintenance Tips—Booklet B-5477, 28 pp, discusses programs designed to reduce shut-down time on production lines and treats in detail the maintenance of power equipment. A suggested schedule of work and cleaning on power equipment is presented in chart form. Essential information on preventive maintenance for turbines, generators, switchboards, motors and controls given. Westinghouse Electric Corp.

242 Electrical Equipment for Cranes — A complete line of electrical equipment designed exclusively for crane service is presented in 32-pp Bulletin C5-1. Covers everything from company's a-c Magnetorque crane control to current collectors, and is generously illustrated with photos, charts and drawings. Includes full data on motors, brakes, controllers. Overhead Crane Div., Harnischfeger Corp.

LIGHTING

243 Recommended Lighting Systems — This 16-pp article describes six lighting systems adaptable to most industrial plants. They include systems for illumination levels 20 to 40 ft-c, for levels of 40 to 60 ft-c and for levels of 60 to 100 ft-c, and involve use of filament, fluorescent, and mercury lighting and combinations of

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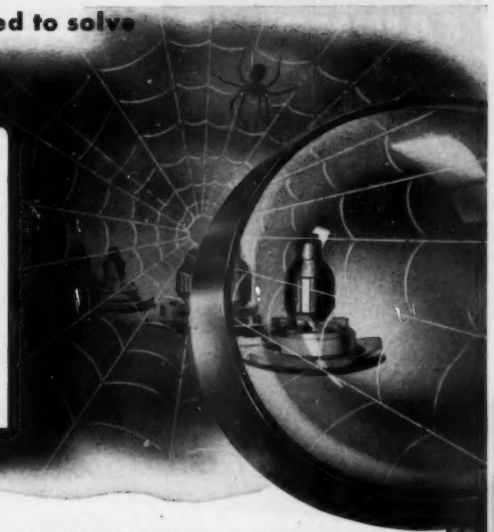

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these. Explains lighting classifications, and discusses advantages of each type of lighting. Lamp Dept., General Electric Co.

244 Industrial Lighting at Work — Sixteen pp Booklet B-4727 stresses three ways of putting better lighting to work; cutting costs by promoting more production; increasing efficiency by ensuring accuracy, and reducing accidents by exposing dangerous operations. Analyzes mercury vapor and incandescent light sources as to efficiency, service life, maintenance, mounting height and job suitability. Luminaires of each type are pictured; wattage and lumen output ratings. Westinghouse Electric Co.

245 Precision Lamps—Bulletin 40 offers application and purchasing information on various types of lamps carried by manufacturer. Flood, infra-red, spatterproof, and weatherproof lamps are briefly discussed. Radiant Lamp Corp.

246 Lighting Fixtures—Full information on company's fluorescent lighting fixtures designed for efficient industrial lighting and reduced maintenance is provided in Form OD-568. Day-Brite Lighting, Inc.

See pages 37-38 and 189-190 for postage-free mailing cards. Use them to ask for bulletins — just circle item numbers of all those wanted.

247 Selection Data on Lighting Fixture Hangers—Catalog 50, 80 pp contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

MAINTENANCE

248 Corrosion-Preventive Coatings—This 16-pp illustrated booklet covers a family of products for fighting corrosion. Presents characteristics and application data on hot and cold applied tar base coatings, alkyd resin coatings, chlorinated rubber base coatings, vinyl and phenolic coatings. Includes finder chart. Protective Coatings Div., Pittsburgh Coke & Chemical Co.

249 Building Maintenance — Handbook 7 offers 64 pp of information on floor surfacings, leak stoppers, external wall sealants, road patching, roofing materials. Includes instructions for use. Flexrock Co.

250 Floor Maintenance—This 12-pp brochure presents a complete and economical program for the care of wood and concrete floors, terrazzo, linoleum and tile. Points discussed include wear resistance, appearance, sanitation, cleanliness, light reflectance, sealers and hardeners, burnishing and buffing. The Tremco Mfg. Co.

251 Protective Paints — Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis, and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for use on wood, metal surfaces. Cellulose Products Dept., Hercules Powder Co.

252 Roofing Manual—Engineering data on roofing is given in Specifications 50, 30 pp. Covers coal tar pitch roofings, waterproofings, insulations, flashings, protective coatings. Includes illustrated instructions. Tar Products Div., Koppers Co., Inc.

253 Basic Roofing Information—"What You Should Know About Your Roof" is a 40-pp, clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also,

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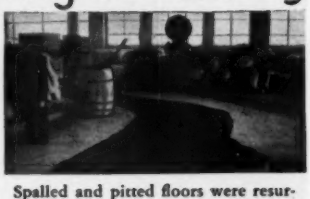

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PRODUCTS AND METHODS FOR BUILDING MAINTENANCE

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special features of company's roofing materials. Johns-Manville.

255 Floor Maintenance Buyers' Guide—Brief, but practical application details on floor machines and accessories and a wide range of floor cleansers, waxes and other preparations are presented in this illustrated bulletin. Finnell System, Inc.

256 Vacuum of Many Jobs — Bulletin 144, 20 pp, describes and illustrates 132 unusual industrial uses for company's vacuum system. The Spencer Turbine Co.

257 Portable Power Scaffold—The portability and job versatility of the Roll-o-Hoist scaffold is stressed by text and photo in Bulletin 1000. Optional gas engine and electric power drives are described as are tip-over buckets for use with the scaffold. St. Anthony Machine Products Co.

WIRE ROPE

258 To Keep Wire Rope at Work—Form 3547 is an 82-pp handbook titled "Here's How To Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks, when to discard a wire rope. Wire Rope Divs., American Chain & Cable Co., Inc.

259 Wire Rope Handbook—Catalog G-15, 170 pp, is pocket-sized and thumb indexed, and one of the handiest available from standpoints of practical information, easy reference and clarity. Provides up-to-date information on a wide range of Preformed and regular type wire ropes, slings and fittings and includes a section of data helpful in selecting the right rope for the job, installing it properly and keeping it in condition to get best use from it. Macwhyte Company.

260 Wire Rope, How to Use It—Practical information on the use and care of wire rope is given in 72-pp pocket-size Catalog C-51. Covers unloading, storing, kinking, unreeling, installing, breaking in, methods of seizing and cutting, measuring, end preparations, many other pertinent factors. Fully illustrated with photos and sketches, treats splicing in detail and includes chapter on lubrication. Also presents data on wire rope constructions, efficiencies of fittings. Available to qualified plant engineers. A. Leschen & Sons Rope Co.

CONSTRUCTION

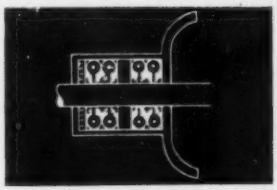
261 Technical Manual on Plywood — Available basic data on Douglas fir plywood, its properties and use, are offered in looseleaf sections with firm binder. Presents engineering information about this panel material and its performance in varying applications. Covers commercial standards, designing with plywood, prevention of condensation, lateral bearing strength of nailed plywood joints, deflection. Please give your title when requesting this book. Douglas Fir Plywood Assn.

262 To Nail It Right—Available for use with company's hardboards in plant construction work is the "Dial-It-Right, Nail-It-Right," a small cardboard reference wheel. The "Dial-It" side shows type and thickness of hardboard for exterior and interior walls, ceilings, underlayment wainscots, bench tops, doors and other uses. Reverse side gives nailing instruction. Masonite Corp.

263 Floors for the Job—The merits of selecting the proper flooring for any industrial installation is stressed in this literature. Explains how company is set up to offer assistance in choosing flooring to meet individual plant needs. Kentile Inc.

264 Industrial Steel Windows—Planned to offer comprehensive easy-to-find data, this 24-pp catalog gives descriptions, specifications, sizes, uses and advantages of Fenestra pivoted windows, commercial projected windows, and security windows used separately and in combination, also continuous windows used mainly for top-lighting in monitor and sawtooth roof construction. Detroit Steel Products Co.

Chesterton 444



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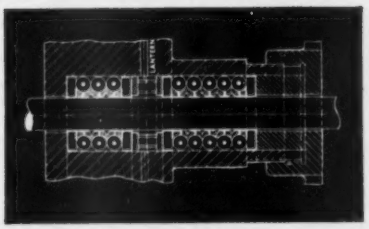

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265 How to Glaze with Plexiglas—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this plastic sheet and detailed data on installation methods and ways of cleaning. Plastics Dept., Rohm & Haas Co.

266 Aluminum Building Sheet — Stressing advantages of aluminum for siding and roofing, 12-pp Form AD-247 presents both dimensional data and engineering details covering its use. Provides illustrated suggestions for use of fasteners, flashing details, directions for applying the sheet. Includes tips on painting, welding, storing. Aluminum Co. of America.

267 Non-Slip Flooring—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features, gives fabricating data, sizes, allowable loads. Pictures some applications. Alan Wood Steel Co.

TOOLS

268 Pipe Tool Book—This catalog and data book gives information on pipe and bolt machines, power units, ratchet threaders, reamers and cutters, other power and hand tools. Includes popular "operating guide" section, fully illustrated with easy-to-grasp drawings. Beaver Pipe Tools, Inc.

269 Pipe Tool Ordering Guide—Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives sizes, prices. Armstrong Bros. Tool. Co.

270 For Faster Fastening — Form 35-A explains and illustrates company's system of fastening tools and fasteners for use with steel, wood, concrete, fabricated hard materials. Ramset Fastening System, Inc.

271 Idea Book — Sixty pages of "1001 Shortcuts" for production, construction and maintenance make this hand-tool and hydraulic-tool handbook one of the most useful ever. Large photos and concise descriptions give ideas developed and successfully applied by hundreds of tool users. One of the big values attached to the "Idea Book" comes from the manner in which it stimulates the user to create his own ideas. Typical job photos suggest the general principles of the applications. Blackhawk Mfg. Co.

272 Radial Arm Saws—This 12-pp catalog describes company's full line of radial arm saws for industrial, other uses. Complete specifications of four models given. Special accessories are illustrated. Delta Power Tool Div., Rockwell Mfg. Co.

273 Metal Spraying Gun — Company's Type 4E gun for high-speed spraying with

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Trouble-breeder for steam turbines is off-the-line standby when moisture accumulating inside frequently starts localized pitting or general corrosion.

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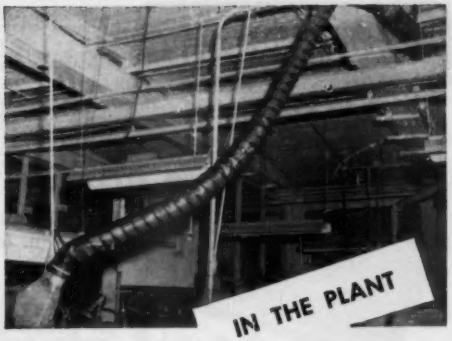

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all metals is described in Bulletin 94. A cutaway drawing shows construction features of the gun which is designed for tool-post mounting or hand operation. Metallizing Engineering Co., Inc.

274 Tube Working Handbook — Form 369-A is a 32-pp booklet on tube working tools. A section on modern tube working practices covers handling, cutting, flaring, reaming, refacing or fittings, bending, soldering and other operations. Company's line of tools is described. The Imperial Brass Mfg. Co.

VENTILATING, DEHUMIDIFYING, AIR CONDITIONING

275 Efficient Dehumidifying—Bulletin 222 is the 32-pp recent edition of company's popular booklet showing how modern dehumidifying equipment solves moisture problems for industry. Illustrated by 70 photos and diagrams of installations, describes many production, handling and storage problems solved by installing manufacturer's Lectrodryers. Covers their use in storage areas, in materials handling, spot drying. Pittsburgh Lectrodryer Corp.

276 Putting Air to Work—Catalog 600 is an excellent, 60-pp reference text on air and products to put it to work. For plant engineers concerned with heating and ventilating of plant areas; air conditioning installations; means of exhausting fumes, gases and dusts; conveying chips and granular materials; elimination of airborne dirt—this book is a valuable tool. It's packed with information on selecting and applying equipment, and there is a section of frequently-used reference data. Sturtevant Div., Westinghouse Electric Corp.

Postage-free Reader Service Cards make it easy to order any of this literature. See pages 37-38 and 189-190.

277 Versatile, Flexible Tubing—Catalog 5-4 is an 8-pp folder on Spiratube, a tubing made of spring wire within overlapping plies of spirally wound fabric and designed for a wide range of ventilating and conveying jobs. Special features are presented and four types of this tubing discussed. Flexible Tubing Corp.

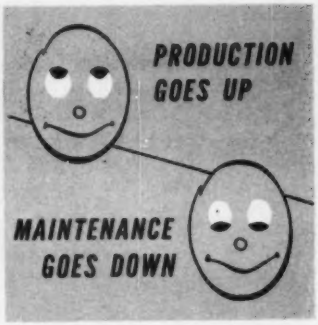
278 Heavy Duty Ventilation Filters—Form DPF-100.LH presents a dry panel filter with a filtering area of 23 sq ft. Tells features, uses; includes installation data, filter selection chart. Dollinger Corp.

279 How Conditioning Units Can Help—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling, hot water, steam heating. Clarage Fan Co.

280 Fans for Tough Exhaust Jobs—This is an 8-pp revised edition of company's catalog on Bifurcator fans, designed for exhausting fumes or gases which are abnormally hot, flammable or explosive. DeBothezat Fans Div., American Machine & Metals, Inc.

281 Fans and Blowers—Illustrated Catalog 21A, 64 pp, gives ordering information on company's fans, blowers, roof ventilators and related products, including application suggestions, ratings, dimensions. Explains principle of curved orifice air-sealing incorporated. Provides directions for installation and operation, maintenance and lubrication. Hartzell Propeller Fan Co.

282 Air Filtering Costs—"A Comparative Study of Air Filtering Costs in Central Systems" describes a study made for the purpose of clarifying costs of air filtration, particularly as between cleanable units and replacement-type air filters. Gives data on factors for cost analysis—original equipment, maintenance and over-all cost. Air



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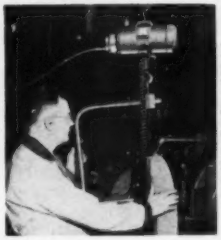
LIGHT WEIGHT—300 and 1,000-lb hoists weigh only 30 lb; 1-ton model only 75 lb.

CONTROLLED SPEED with finger-tip control; lets the operator spot loads accurately.

CAN'T BURN OUT from stalling . . . nor can the air motor be injured by dust or fumes.



Mounting grinding wheel on a grinder. There are dozens of such uses in manufacturing plants.

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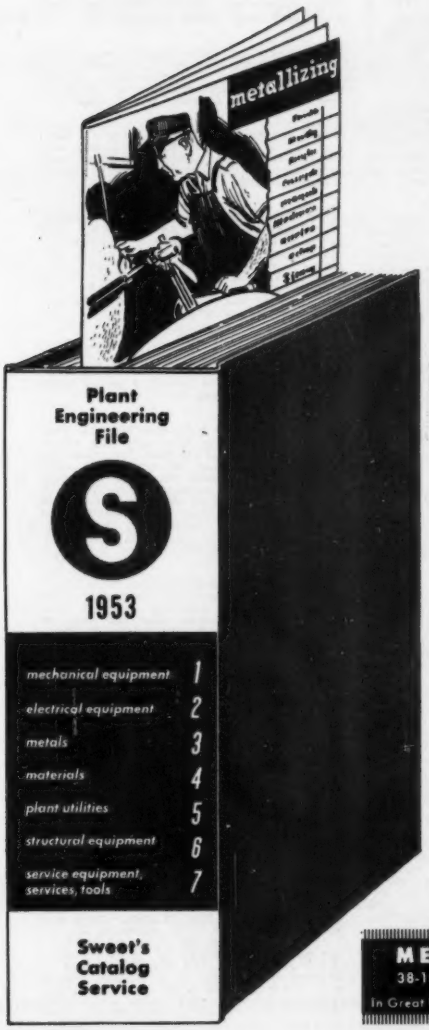

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filters for central system installation are described and pictured. Owens-Corning Fiberglas Corp.

283 Push-Button Ventilation — Six-pp Bulletin 680 gives sizes, dimensions and performance data on power roof ventilators for flat, curved or peak roof installations, capacities to 78,800 cfm. Cites advantages of ventilation by positive air displacement. Propellair Div., Robbins & Myers, Inc.

DUST CONTROL

284 Dust Control—Bulletin 98 explains value of industrial dust control and principles of dust suppression, collection by filtration. Describes dust control equipment, providing specifications, dimensions on filters, systems, automatic controls. The W. W. Sly Mfg. Co.

285 Wet Method Dust Collection — Besides presenting company's line of Multi-Wash dust collectors, dewatering tanks and pumps, 22-pp Bulletin 510 explains advantages of wet method of dust control, discusses both simple installations and those requiring additional equipment. Covers in detail the widely used Senior collector, the Junior collector for single function operations, settling and dewatering equipment. Claude B. Schneible Co.

286 Dust Recovery — "Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoints of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

287 Dust Control Technology — Detailed selection, operation and maintenance data are contained in this 50-pp digest-size book, "Industrial Dust Control Through Exhaust Systems." Treats exhaust hoods, piping systems, dust collecting equipment, exhausters and drives. Lists basic methods of dust control and analyzes elements of exhaust systems. Pangborn Corp.

288 Dust Collectors — Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

VIBRATION, SOUND CONTROL

289 Engineered Vibration Control—Bulletin 104 presents spring, cork and rubber mountings, discussing advantages of each and use alone or in combination. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co., Inc.

290 Simplified Isolation — A simplified method of machine isolation which utilizes pads and cement is described in this small folder. Explains how it reduces maintenance cost. The Felters Co.

291 Sound Facts—This little folder gives the ABC's of noise. Tells what it is, how it is measured, and how company's sound control installations work to reduce noise levels to comfort range. Illustrates and describes briefly: machinery enclosures; sound barriers, traps; sound proof rooms. Industrial Sound Control, Inc.

HEATING, COOLING

292 Heating, Air Conditioning Book—Bulletin PB-290, 36 pp, is a complete, condensed catalog covering company's full line of air conditioning, heating, ventilating and heat transfer equipment. Supplements some 40 specialized bulletins on various product lines. The Trane Co.

293 Heat-on-Wheels for Industry—Illustrated Form 3574, 16 pp, is the story of how manufacturer's portable heaters can solve emergency heating problems. Shows how these heaters provide extra heat for the hard-to-heat spots, and for extra cold areas, to spot heat where needed, and for ventilating, drying and thawing jobs. Filled with photos of these heaters at work. Herman Nelson Div., American Air Filter Co., Inc.

The new Reader Service Cards on pages 38 and 190 are easy to use and need no postage. Just circle the item numbers of catalogs wanted, fill in name and company, etc., and drop the card in the mailbox. You'll receive the literature from the manufacturers at no cost to you.

294 What Unit Heaters Can Do—Featuring many photos showing how unit heaters are being used to provide heating comfort, cut fuel costs, provide economical air circulation, 8-pp Bulletin 149-A discusses advantages of these heaters and includes performance data. Modine Mfg. Co.

295 Propeller Fan Unit Heaters—Twelve-pp Bulletin 1301 shows how unit heaters can solve many a space heating problem. Both horizontal discharge and vertical discharge units are covered, and outstanding construction features detailed. Suggestions on where to place heaters provided, also basic capacity data. C. A. Dunham Co.

296 Industrial Dry Coolers — Illustrated Bulletin DC-50, 12 pp, presents dry cooling equipment for small, "in-between," and heavy-duty cooling jobs and includes three recent models. Two are small "portable" units and the third a medium-size unit. Although designed primarily for cooling engine jacket water, they can be used for cooling natural gas, lube oils, fluids of refining stages. The Marley Co., Inc.

297 Jacket Water Coolers — Illustrated Catalog 1351 describes a line of engine jacket water coolers described as extremely rugged units capable of withstanding abuse of portable equipment installations. Details new design features of the units. Young Radiator Co.

INSULATION

298 Heat Insulation—This 8-pp booklet on hydrous calcium silicate insulation is illustrated with graphs, tables and drawings showing numerous ways this insulation is used in industrial and commercial projects for temperatures up to 1200 F. Lists wide selection of shapes and sizes. Kaylo Div., Owens-Illinois Glass Co.

299 Pipe Insulation—Form 78-102 is a small folder stressing efficiency and economy of Amocel, a lightweight asbestos pipe insulation for temperatures to 650 F. Discusses its low thermal conductivity, high mechanical strength in relation to its weight. Union Asbestos & Rubber Co.

300 Insulation for Metal Buildings—Four types of insulation are listed as forming complete line of insulation for any metal building need. The booklet, BL6.A7, describes flexible Aerocor and blanket type insulation, semi-rigid perimeter insulation, and rigid preformed board insulation. Tables provide condensed information on insulation values of each type, design data. Owens-Corning Fiberglas Corp.

301 One-Coat Insulation — This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Tells how to apply. Insul-Mastic Corp. of America.

VALVES, TRAPS, PIPING AND ACCESSORIES

302 Efficient Flow Control — Data on bronze, iron, steel and corrosion-resisting valves in a wide range of types, for oil, common troubles as well as mysterious. Shows how valves are designed for service, low maintenance. The Wm. Powell Co.

303 Iron Body Gate Valves—Bulletin 805, 8 pp, covers company's popular iron body, bronze trim gate valves in both outside screw and yoke and non-rising stem types, telling best applications for each. Design features explained. The Ohio Injector Co.

304 Small Steel Valves—Illustrated Circular 134 describes a line of small cast steel valves for high pressure service. Tells how valves are built, where to use them. Gives dimensions, weights, prices on both globe and angle types. Walworth Co.

305 Reducing Valve Engineering Data—Bulletin 962 explains how the contour of a pressure reducing valve contributes to efficiency of performance. Discusses straight-line flow, tight closing. A. W. Cash Co.

306 Automatic Valves — Pressure, flow, and liquid level controls for steam, air, gas and fluids are shown in 90-pp Catalog A-50. Includes sizes, prices, capacity charts, conversion tables. Davis Regulator Co.

307 Valve Maintenance Guide — "Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented. Discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

308 Solder Joint Valve — Bulletin 103 describes a 100-lb valve for use with copper tubing. Gives working pressures, temperatures. Tells how to install a solder joint valve. The Kennedy Valve Mfg. Co.

309 Steam Trap Reference Manual—Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure traps sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

310 Steam Hook-ups—This 64-pp manual on hook-ups for steam traps, air vents and temperature controls provides diagrams, size calculators, selection data on traps and regulators, properties of saturated steam, dimensions. Sarco Co., Inc.

311 Steam Trap Book—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

312 Solving Steam Trap Problems—This popular 36-pp catalog on steam traps contains specifications and capacities on steam traps, float traps, air release valves and pipe line strainers. Tells how to calculate condensation loads and select traps for all classes of equipment, including unit heaters, jacketed kettles, autoclaves, submerged surfaces, steam mains and header drips. Gives pointers on how to install traps and service them. The V. D. Anderson Co.

313 Steam, Air and Gasoline Traps — Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications.

the case of Puzzled Pete

Poor Pete! Got so he couldn't look at the maintenance work sheet without wincing. New jobs kept piling up. Completed work wouldn't always last . . . and the maintenance budget wouldn't budge.

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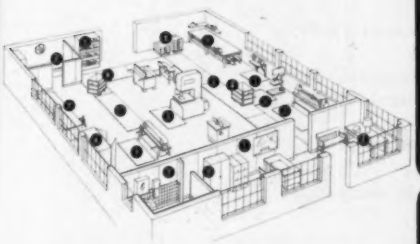
Now the work sheet is back to normal . . . Pete is all smiles . . . and he's keeping inside the budget!



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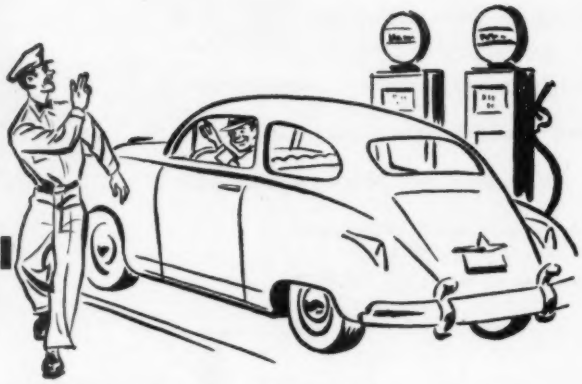
"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Nobody knows for sure how it started—this line about "See you at the Polls!" we're hearing all over these days.

Best explanation seems to be that it came from that state candidate out west. . . . His opponent in a debate got all riled up and challenged him to fight it out in the alley.

But he said—"I'll settle this the AMERICAN way—I'll see you at the polls!" And the audience picked up the chant.

Now everybody's saying it—and on Nov. 4 everybody will be *doing* it!

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures up to 1500 lb; separators. W. H. Nicholson & Co.

314 Steam Trap Selection — Twenty-pp Catalog 600 provides practical selection information on bucket type steam traps, float and thermostatic types, compressed air traps, air eliminators and strainers. Explains how basic design principle of company's Airxpel traps fulfills requirements of a good trap. Includes capacity-orifice chart. Wright-Austin Co.

315 Manifold Discharge Piping Application—Manual 51-B, 34 pp proposes an approach to design of discharge header systems based on partial or complete elimination of back-pressure effects on tied-in safety-relief valves. This principle is claimed to offer great savings in cost of discharge piping. Farris Engineering Corp.

316 Industrial Gaskets — This recently published 50-pp catalog covers an extensive line of gaskets and teflon products, including practically all types of metal, metal-asbestos and special gaskets as well as teflon packing and expansion joints and teflon stock. Includes both engineering and ordering data, application and installation tips. United States Gasket Co.

317 Piping Pointers—This is company's popular piping manual covering fundamentals of sound piping practices. Discusses various types of valve designs and how each should be used. Pictures and names more than 80 kinds of fittings and contains many illustrated how-to-do-it features. Included with the manual is an 8-pp valve selection guide. Crane Co.

318 Design Properties of Pipe—This 12-pp booklet consists of tables listing pipe sizes and wall thicknesses currently established as standard, plus what is believed to be the most nearly complete tabulation ever published of dimensional properties of commerical steel pipe. Tube Turns, Inc.

"Seems we went a little heavy on the acid . . . but heck, all we have to do is plug up a few holes and we'll have practically a new boiler."

319 Packless Expansion Joints—Bulletin 35-51A offers 28 pp of up-to-date information on company's Corrunex joints, their design and installation and advantages over other means of providing for thermal expansion in pipelines. Construction features are explained and illustrated; simplified selection data include tables for determining amount of expansion in pipelines. American District Steam Co., Inc.

320 Unions and Fittings — Twelve-pp Catalog 50 covers manufacturer's line of unions of all types, elbows, tees and fittings. Dart Union Co.

321 Flexible Hose, Bellows — Catalog CMH-123, NPH, 16 pp, describes and gives specifications for manufacturer's line of Flexon bellows and flexible metal hose. Information on metallic bellows of stainless steel, brass, bronze and other alloys is included, covering bellows used in many

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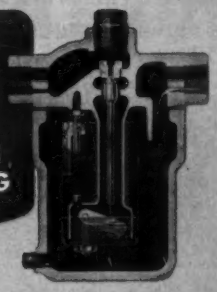

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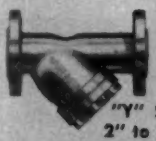
Remove Both Air and Condensate

"CUB" TYPE
½" to 1½"
to 250 PSIG

"MASTER" TYPE
½" to 2"
to 300 PSIG

This equipment offers design advantages that represent long experience in building steam saving devices for industry.

Orifices of Wright-Austin traps can be interchanged without disassembling the trap. Connections are the straight-through type. Both of these features contribute to speed and ease of installation.



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2" to 8" (flanged)
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Wright-Austin traps are available for lines ½" to 3", for pressures up to 600 P.S.I.G. and with capacities up to 65,025 pounds of water per hour.

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½" to 1¼"
to 600 PSIG

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types of control, regulators and thermostatic devices. A selection guide is provided for steam traps, valves. Flexonics Corp. (formerly Chicago Metal Hose Corp.)

BOILERS, GENERATORS

322 Steam Generators—Twenty-pp Bulletin SB43, 20 pp, describes company's VL factory assembled generators combining 2-drum water-tube boiler, integral water cooled furnace, brick work, insulation and steel casing. A large cutaway illustration shows design details, and gas travel, circulation and furnace interior are also pictured. Use of the generator with various fuels and firing arrangements is covered, dimensions included. Erie City Iron Works.

323 How Much for Steam — Here's a "slide rule" calculator for computing steam costs. It's pocket-sized, and enables a plant engineer to find comparative steam costs per 1000 lb, using coal, oil or gas, and based on fuel costs of price per ton, gallon, cubic foot. Cleaver-Brooks Co.

324 Oil or Gas Fired Automatic Boilers —Boiler, burner, controls and safety features of 10 to 500 hp oil or gas fired automatic boilers are described in this 4-pp bulletin. Firing rates, dimensions and capacities are given for all models. Boiler Engineering & Supply Co., Inc.

MATERIALS HANDLING

325 Shovel and Loader — Described in 12 pp Bulletin 1032 is a hydraulic crown and hoist shovel and loader incorporating mechanical features usually associated with big shovels. Illustrates, gives specifications, application information on both pneumatic traction and crawler traction models. Dempster Bros., Inc.

326 Materials Handling Equipment — Illustrated Catalog F602 is a 44-pp guidebook on materials handling equipment for industrial plants. Subjects covered include description and application data on company's gas and electric fork lift trucks, motorized hand trucks, hand lift trucks and hand and electric hoists. The Yale & Towne Mfg. Co.

327 Industrial Logistics — Form A-9516-4450 is a 12-pp booklet covering strategic handling of materials from raw state to distribution. Discusses master unit load and transportation cycle. Explains company's system of adapting all loads to four types of containers, assembling maximum numbers of these into master unit loads, and transporting them as single units. The Elwell-Parker Electric Co.

328 Safe Truck Operation — "Safety Saves!" is a 24-pp booklet setting forth "do's" and "don'ts" established as a practical code of truck operation. The admonitions, pointed up by cartoons, serve as both "refresher course" and text. Industrial Truck Div., Clark Equipment Co.

329 Hydraulic Lift Trucks—This catalog provides engineering and ordering information on manufacturer's complete Weld-Bilt line of hydraulic lift trucks in 2500- to 10,000-lb capacities. Also covers skid platforms, pallet lift trucks, two-wheel trucks. West Bend Equipment Corp.

330 All-Purpose Lifts—"Let Big Joe Do It" is a bulletin on hydraulic lifting units. Features a heavy duty model for lifting loads to 52 in. height. Big Joe Mfg. Co.

331 Stand-Up Fork Lifts — Complete specifications are available on stand-up fork lift trucks in 2000- and 3500-lb capacities. These trucks feature easy maneuverability and manufacturer's Lev-R-Matic drive. Mobilift Corp.

332 Hydraulic Lift Trucks—Latest line of hydraulic lift trucks is described in 8-pp Bulletin 525. Trucks are hand-operated pallet trucks, with a package hydraulic unit for raising the truck bed under the load. Features listed include hydraulic lifting and lowering, easy travel and stability. Complete specifications are presented for 2500-, 4000- and 6000-lb capacity models. Barrett-Cravens Co.

333 Elevating Table — Bulletin 206 describes and pictures manufacturer's line of hydraulic elevating tables. Models shown can be used for die handling, or positioning, also strip and sheet feeding operations; capacities range from 2000 to 20,000 lb. Specifications given. The Raymond Corp.

334 Single Drum Hoist—Sixteen-pp Bulletin 76-X describes single-drum, portable multi-purpose hoists for industrial plants, construction work. Joy Mfg. Co.

335 Portable Hoists — This bulletin describes a lightweight air hoist in 2000, 1000, 500 and 300-lb capacities. Gives specifications, dimensions. Keller Tool Co.

336 Trolley Hoists—Bulletin DH-269, 2 pp, describes and pictures ½ to 3 t capacity army-type trolley hoists, plain or geared, for use where a close headroom assembly is required. Gives dimensional and capacity data, prices. Wright Hoist Div., American Chain & Cable Co., Inc.

337 Electric Hoist Manual—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

338 Chain Hoists — Catalog 61, 32 pp, covers a line of chain hoists, telling how to select and use them. Provides an illustrated comparison chart of hoist types, a selector table and discussion of factors to be considered in buying a hoist. Multiple gear chain hoists, screw gear chain hoists, differential chain hoists described separately. Reading Crane & Hoist Corp.

339 Industrial Lifts—This booklet presents a wide range of elevating equipment

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designed to step up efficiency and cut handling costs. Covers dock lifts, crossover bridges, sidewalk elevators, truck service lifts. The Wayne Pump Co.

340 Manual on Electric Hoists—Catalog H-46, 44 pp, covers monorail and stationary hoists and car pullers. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

341 Electric Lifters—Medium and heavy-duty electric lifters are described and illustrated in Bulletin LU50. Company's ball bearing hoisting unit is discussed. Economy Engineering Co.

You may use the new Reader Service Cards to request information on ads, too. Just circle the key number appearing at bottom of ad.

342 For Efficient Overhead Handling—Bulletin C-1, 56 pp, pictures overhead equipment for practically all industries. Stresses construction, safety, electrical advantages of trolleys, cranes, track and auxiliaries. Includes layout information. The American MonoRail Co.

343 Data on Tramrail Equipment—Twelve-pp Form 2008F is a recently revised booklet on tramrail systems. Tells what an installation can do toward improving handling efficiency. Rail and arch design, switches, cranes and transfer bridges, carries, hoists, cranes, buckets, grabs are pictured. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

344 Handbook on Overhead Conveying Systems—Manual A-56 provides 200 pp of information on overhead track systems and conveying equipment. Pictures installations, construction details; gives engineering data. Richards-Wilcox Mfg. Co.

345 For Overhead Handling—This 12-pp illustrated catalog covers motorized and hand operated cranes and monorails engineered for efficient, low-cost handling. Special construction features are detailed; accessory equipment shown. Abell-Howe Co.

346 Rough Top for Belts—Five designs of rough top surfaces which can be put on company's conveyor belts are pictured in Bulletin A-5148-K. Recommended applications for each design are discussed briefly. Goodyear Tire & Rubber Co.

347 Conveyor and Elevator Belts—This 26-pp collection of catalog sections illustrates parts used in construction of company's conveyor and elevator belts. Discusses increased service life and decreased maintenance. The B. F. Goodrich Co.

348 Metal Conveyor Belts—This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belt; covers raised edge and flight constructions, chain edge constructions, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

349 Feeders, Conveyors—An excellent presentation of electric vibrating feeders and conveyors is given in 90-pp Catalog 830 covering manufacturer's line of equipment for handling a wide variety of wet and dry materials and including large and small capacity units, for temperatures of -30 to 2000 °F. Explains principles of design, operations. The Jeffrey Mfg. Co.

MECHANICAL POWER TRANSMISSION

350 Belts to Suit the Job—This bulletin presents company's "inner-locked" woven duck belting available in types for general elevating and conveying and general power transmission applications as well as special jobs. Imperial Belting Co.

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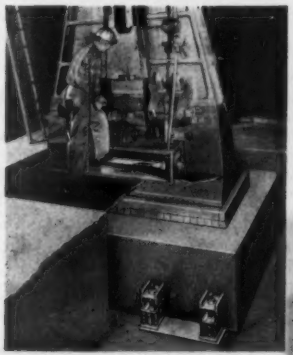
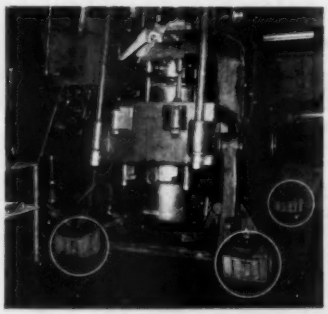
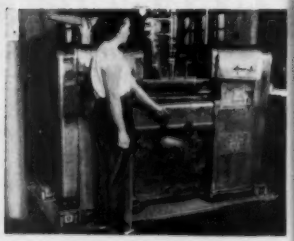


Typical spring-isolated hammer foundation. Shock isolation is so complete that a coin will remain standing on edge beside the foundation as maximum blows are struck. Tests prove there is actually a slight increase in hammer blow efficiency.



Korfund Vibro-Isolators solved a serious vibration problem, and permitted installation of this 100 ton press on a weak upper floor in a loft building. Isolators often permit higher press speeds for greater production.



Today's precision machine tools pay off in high production to close tolerances when protected from external disturbances. Special foundations can often be eliminated with economical vibration control.

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Standard Korfund Isolators are available for most applications. A Selector Chart in bulletin G-105 gives recommendations for both normal and critical conditions, for hammers, machine tools, pumps, compressors, fans and most other mechanical equipment. See Sweet's Catalog Files or write us for your free copy today.

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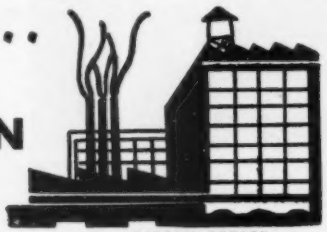

Now that the country's engines, conveyors, compressors, motors, hoists and other machinery is running full tilt on defense production, good lubribation practice is doubly important.

Specific suggestions on lubricating methods that avoid "down time" for overhauling industrial machinery will be found in the Albany Recommendation Chart. Ask your Mill Supply house for a free copy. They can provide the right Albany Lubricants for your equipment.

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351 V-Belt Drive Design Book—Providing 54 pp of engineering data on manufacturer's Bull Dog belts, this catalog gives general drive information as well as simplified methods of selecting V-belt drives, V-flat drives and several types of non-standard drives. Includes selection tables, prices. Boston Woven Hose & Rubber Co.

352 Improved V-Belts — This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

353 Manual on Power Transmission Machinery—Containing 225 pp of data, this illustrated handbook covers roller bearings, V-belt drives, friction clutches, couplings, collars, sleeve bearings, pulleys, take-ups and hangers. Provides engineering data, formulas. Dodge Mfg. Corp.

354 Variable Speed Control Simplified—Bulletin 700 contains some 40 pp of descriptive, application and engineering data on variable speed pulleys and selective speed transmissions. Illustrations show how old and new machines can be equipped with efficient variable speed control. Lovejoy Flexible Coupling Co.

"All right, Johnson! You heard me the first time."

355 Oilless Bearings for Conveyors — Technical Catalog 210, 20 pp, gives detailed information for specifying, installing and use of bearings for screw and roller conveyors, together with operating characteristics. The sectionalized catalog provides tabular data and dimensional drawings to facilitate identification of bearings for replacement. Arguto Oilless Bearing Co.

356 Brakes and Brake Motors—Construction advantages of company's brakes are featured in illustrated Bulletin SL-610-1 on brakes and brake motors. Dimensions, mechanical and electrical characteristics. Crocker-Wheeler Div., Elliott Co.

357 Hydraulic Drive—The Hydro-Sheave, hydraulic power transmission unit, designed for immediate application to electric motors and internal combustion engines in ¾ to 40 hp range is described in illustrated Bulletin 145-B. Tells how unit offers operators of small power units a low cost conversion device as easily applied as a sheave. Twin Disc Clutch Co.

SAFETY, SANITATION

358 Dry Chemical Extinguishers — New quick-acting fire extinguishers of the dry chemical type in 20 and 30 lb sizes are covered in Form C-104. C-O-TWO Fire Equipment Co.

359 Dermatitis Prevention Program—"The Control of Dermatitis in Industry" is a 32-pp booklet on prevention of the skin diseases. Presents a program for providing personal cleanliness, protecting skin areas,

A man with a hate

● There's no halfway feeling about fire and its resulting destruction with an expert fire protection engineer... he actually hates to see a little fire roar into a raging inferno and create a sizeable loss.

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preventing clothing contamination, guarding against special hazards. Lists conditions to be checked to determine cause of dermatitis. A 6-pp chart covering a wide range of industries lists various working conditions and types of dermatitis prevalent, and suggests preventive measures. West Disinfecting Co.

360 Washroom Layouts — Sixteen blueprint drawings of industrial and institutional washroom layouts are shown in this 12-pp booklet. Provides a general discussion of washroom planning, also roughing-in data. Bradley Washfountain Co.

OTHER EQUIPMENT

361 Overhead Doors and Operators — This 16-pp catalog on manufacturer's Overdoors and electric operating equipment explains and illustrates their outstanding features and describes standard models. Engineering data provided include specifications, construction and installation details, and building requirements. Barber-Colman Co.

362 Steam Condensers—Bulletin 102, 24 pp, is a comprehensive presentation of manufacturer's steam condensers and includes photos of six typical installations as well as a section of engineering data, a discussion of air removal equipment and condenser maintenance. Condenser Service & Engineering Co., Inc.

363 Axial Flow Blowers—In this 6-pp illustrated bulletin are described axial flow blowers of both turbine-driven and motor-driven types. Gives capacity and dimensional data, operating range and specifications on both types. L. J. Wing Mfg. Co.

364 Magnetic Selection Guide — Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lifting magnets serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

365 Good Place for Wraps — Manufacturer's Lockerettes, modern scientific locker units combining best features of both lockers and coat racks are described and pictured in Bulletin 658. Vogel-Peterson Co.

366 Power Brushes—Bulletin C-260, describing company's new power brushes, pictures their design. The Osborn Mfg. Co.

367 Standard Screw Products—This 10-pp booklet about "Unbrako" standards tells what they are and the advantages of their use. Gives detailed information on socket head, cap screws, self-locking socket set screws, socket set screw points, flat head socket cap screws, shoulder screws or stripper bolts. Standard Pressed Steel Co.

368 Portable Spray Gun—An easily used and inexpensive spray gun pressurized with a CO_2 cartridge is featured in this single sheet bulletin. Sketches show the gun in use for painting, cleaning, other work. Sullivan-Becker Machine Co.

369 Plumbing and Heating Supplies—Here's a 118-pp ordering catalog listing over 2500 repair parts and precision tools for maintenance of all types of plumbing fixtures. Fully illustrated, includes plumbing fixtures. J. A. Sexauer Mfg. Co., Inc.

370 Progressive Mechanization in Action —Sixteen-pp Booklet GEA-5789 sets forth a program to help plant engineers step up the mechanization of operations for greater productivity, better products, lower unit cost. Discusses and illustrates this program through stages of hand operation, simple mechanization and improved mechanization to automatic control and continuous process stages, telling which operations would be benefited by the use of machines, greater power, higher speeds. General Electric Co.

705 Where Refuse Is Fuel—Presented in 24-pp Bulletin 505 are installations of company's RotoStokers and RotoGrate stokers for use with medium size and larger units burning refuse fuels separately or in combination with coal. Lists many of the refuse fuels handled successfully by these spreader stokers. More than 20 installations shown. Detroit Stoker Co.

706 Tips on Plant Protection—Instructive information for engineers whose plants are engaged in defense production is furnished in this 16-pp manual. It is intended to solve plant protection problems by instituting security systems for preventing loss of life, damage to property. Training of personnel, planning of hourly routes, safety factors, fire prevention discussed. Detex Watchclock Corp.

707 Elevated Steel Tanks—Welded steel tanks with ellipsoidal bottoms and roofs are presented in this 24-pp booklet as an economical means of increasing plant water storage capacity, maintaining uniform pressure. Chicago Bridge & Iron Co.

708 Neoprene Goes to Work — Eight-pp Bulletin A-18 discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

709 Tough and Flexible—Information is offered on Dynaprene cord, designed for durability and resistance to abrasion and cutting. Tells other advantages of this flexible, flame retardant cord. Whitney Blake Co.

710 Solder Text—This 36-pp book is basically an editorial treatise. Separate sections are devoted to thermal effects, mechanical properties, principles of soldering and fluxes. Selection of proper solder for the job is explained, and fusible alloys described. Practical suggestions and description of company's solders are provided. Federated Metals Div., American Smelting and Refining Co.

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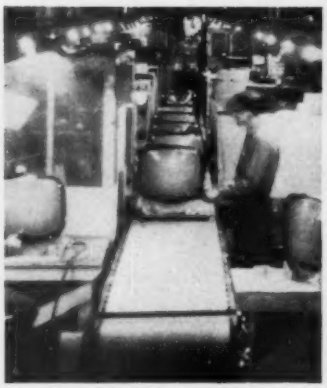
For the belt with the toughest job in the radio-television industry, we nominate this Imperial Standard Rexall Belt in the Motorola, Inc., plant in Chicago. Seventy-pound TV chassis are slid onto this belt from the sides, and removed the same way, at a rate of some 300 per 8-hour shift. To resist this terrific surface abrasion, Motorola chose a 4-ply Standard Rexall (24" wide and 247 feet long). It's one of 11 belt conveyors equipped with Imperial belting in Motorola plants.



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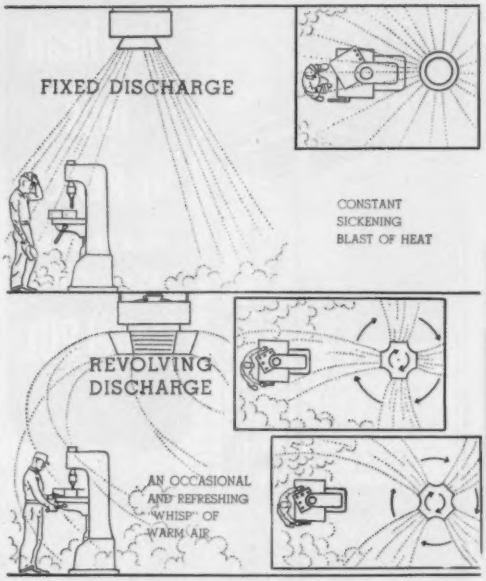

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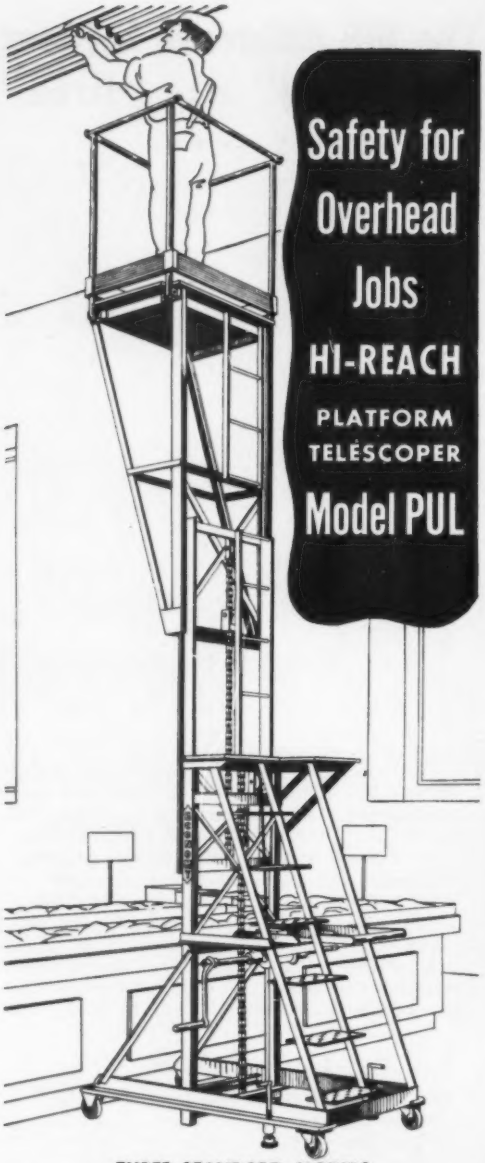

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Improved Casting Impregnation Method

SAVINGS OF materials, production time and machining costs are promised to result from a new improvement in resin impregnation of porous castings shown at the annual Metal Show by Polyplastex International, Inc., 441 Madison Avenue, New York 22, N. Y.

Utilizing a new type of synthetic resin, and a combination of vacuum and pressure, the Polyplastex method is the result of many years of development in close coordination with engineers of the various armed services branches. According to engineers, the idea of impregnation or "sealing" is not new, but previous sealing materials, which have included inorganic materials such as sodium silicate and organic materials such as tung oil or castor oil, were expensive to apply, and did not produce satisfactory results. Such treatments only partially filled the pores, and causing low sealing efficiency and unstable results when the treated casting was subjected to both extreme pressures and temperatures.

The Polyplastex method offers for the first time a reproducible way of complete impregnation with a stable material that resists pressure, temperature extremes, solvents and corrosive chemicals, as well as petroleum products of all kinds.

The basic material used to impregnate the castings is Polyplastex MC, a 100 per cent solids sealant synthetic resin of the thermosetting type—that is, it is polymerized or cured by heat. Unlike many thermosetting resins, however, the resins used do not give off gas or shrink when baked—all of the resin impregnated in the pores becomes a solid with excellent physical and chemical properties.

While research has developed new materials and methods for processing porous castings, the standard government approved procedure is followed. Leaking castings can be salvaged by one of the following methods: (a) External vacuum; (b) Internal pressure; (c) Internal vacuum; or (d) Vacuum and pressure—the most commonly used method. No surface stain or film is left by the process, so that the properties of the casting are not in any way impaired.

Both ferrous and non-ferrous metals can be economically processed by the Polyplastex method. Perhaps its greatest use is in aluminum and magnesium castings, since microporous flaws are particularly prevalent in low-density metals. In addition to its widespread use in ordnance and other military components, many manufacturers are using the process for aluminum and magnesium castings which are part of aircraft and high pressure equipment.

USE THE SAME TREATMENT TO PREVENT LEAKY WALLS...

...AND CONTROL THESE UGLY WHITE STAINS!
Masonry, being porous, is a two-way street for water. Water soaks IN during wet weather, causing interior leaks; it evaporates OUT during fair weather, bringing with it chemical salts that cause unsightly white stains — efflorescence. THE ANSWER TO BOTH PROBLEMS IS DARACONE!
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DARACONE is the proven way both to control leaks and end the major cause of efflorescence in any type of exterior, above-grade masonry!

DARACONE is a clear, high-silicone-content water-repellent that *penetrates deeply* into the masonry, lining pores and hair-line cracks with an insoluble, non-oxidizing film of silicone. This effectively *stops* the capillary action by which water is absorbed. DARACONE does not affect the appearance or "breathing" qualities of your building.

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For more facts circle 656 on Reply Card

NEW BOOKS for the plant engineer's library

About Engineers

ENGINEERS AND IVORY TOWERS by Harvey Cross. Size 8 by 5½ in.; 141 pp; cloth bound. Published by McGraw-Hill Book Company, Inc, 330 West 42nd St., New York 36, N. Y. Price $3.00.

THIS INTERESTING little book reflects a philosophy about engineers and engineering formulated by the author over a period of about 30 yr.

It reports that engineers are sometimes inclined to rely too much on standardization and brings out the fact that formulas and rules are applied where an opportunity for some good original thinking exists. The book also covers training and education of engineering students.

The Story of Lead

LEAD IN MODERN INDUSTRY. Size 6 by 9 in.; 230 pp; cloth bound. Published by the Lead Industries Association, 420 Lexington Ave., New York 17, N. Y. Price $1.50.

DWELLING BRIEFLY on the historical aspects of the lead industry, this book describes in detail the uses of the metal in modern living.

The various processes for producing finished products such as extrusions, casting, and rolling are outlined. The most common products, including storage battery plates, lead sheathing for cables and lead sheets for tank linings have individual chapters devoted to their formation.

Descriptions of the many varied applications of lead in industry are complete and informative.

The final chapter of the book is devoted to graphic representation of the physical constants of the organic and inorganic compounds of lead, and of the lead salts of organic acids.

Engineering Mechanics

MECHANICS: PART 1, STATICS by J. L. Meriam. Size 6 by 9 in.; 340 pp; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y. Price $4.00.

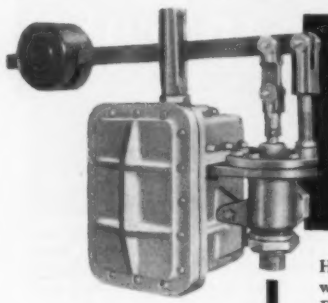
THIS IS THE FIRST of two volumes of the author's study in basic mechanics. The second will deal with dynamics. The book is written to integrate the usual pre-engineering background of physics, mathematics, and graphics. Emphasis is placed on the importance of principles and the problems which apply them. To stimulate interest, 672 problems, taken from diversified engineering fields, are presented. Some are answered, and all are profusely illustrated. The basic principles, and their related problems, are arranged in order of increasing difficulty, and follow a clear, concise development pattern.

Packaging — Materials Handling

Packaging Series. Published by American Management Association, Inc., 330 West 42nd St., New York 36, N. Y. Price $1.25 (non-members), $1.00 (members).

IMPROVED METHODS OF PACKAGING PRODUCTION AND MATERIALS HANDLING, No. 38, 40 pp. This booklet covers papers presented at the Packaging Conference of the AMA held the early part of this year. Table of contents includes: Setting efficient standards on packaging machinery; maintaining quality output on the production line; New developments in package checkweighing; Improvements in carloading technique; and Materials handling and the use of the pallet as a package.

THE GENERAL MOTORS PACKAGING PROGRAM, No. 40, 39 pp. Table of contents covers: Background and highlights of the General Motors packaging program; Automotive package engineering procedure; Pio-



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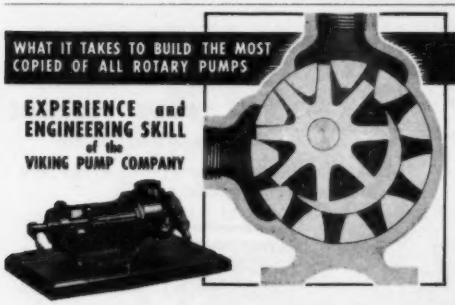

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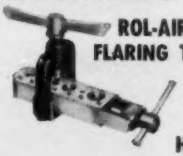

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neering in corrosion prevention; General Motors contributions to military packaging; Semi-automatic packaging for a low-volume packaging operation; Developing a machine for a specific job; and Unitization of material for mass-production handling.

Electric Motor Controllers

CONTROLLERS FOR ELECTRIC MOTORS by Henry D. James and Lewis E. Markle. Second edition; size 6 by 9 in.; 418 pp; illustrated; cloth bound. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. Price $7.00.

THIS SECOND edition covers recent advances in control engineering. This book is intended to help plants get maximum power and use from electric motors and offers guides to help in the selection of the right controllers for specific load requirements.

There is new material on the magnetic amplifier, magnetic clutches, the eddy-current brake, crane control, and direct current control. Five different systems for controlling alternating current motors are explained and illustrated, including the latest type using saturated-core reactors.

In addition to the new material, the book shows the best methods for motor acceleration, speed control, mechanical and dynamic braking, and regeneration. Special sections discuss protective devices, installation, maintenance, inspection and future control developments.

Heat Exchanger Standards

STANDARDS OF TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION, Third Edition. Size 8½ by 11 in., 162 pp; flexible cover; wire ring binder. Published by Tubular Exchanger Manufacturers Association, 53 Park Place, New York 7, N. Y. Price $5.50.

THE NEW EDITION of the TEMA Standards comprises 58 more pages than the second edition. This edition extends the scope of the Standards to include TEMA Class A Heat Exchangers employing alloys and special materials of construction. It incorporates other important additions to and revisions of the previous edition, published in 1949. Additions to the mechanical and thermal standards reflect current findings and conclusions of the TEMA Technical Committee.

To make the edition a single completely self-contained reference source, a General Information section has been added. This section conveniently brings together in one volume with the TEMA standards, helpful data formerly obtainable only from scattered sources, and includes tables recently made available on maximum allowable stress values of exchanger materials of construction.

Tear Sheets Available

Readers wishing tear sheets of any article appearing in the issue for their personal file may obtain them by indicating the item desired on one of the post cards appearing in this issue. — Editors

Climate and Man

CLIMATE IN EVERYDAY LIFE by C. E. P. Brookes. Size 8⅜ by 5¼ in.; 314 pp; cloth bound. Published by Philosophical Library, Inc. 15 East 40th St., New York 16, N. Y. Price $5.00.

THIS BOOK offers general information on the world's climates. These range from the northern regions to the tropics. It brings out the importance of climate as a factor in the selection of sites for manufacturing plants and homes.

The bad effects of the elements are covered, giving the reader an idea what can be expected from such weather phenomena as tornadoes,

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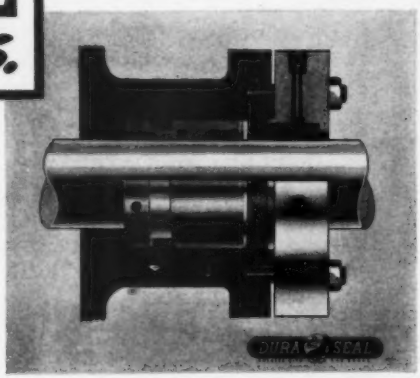

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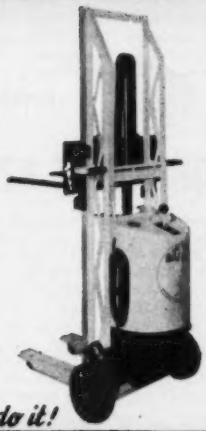

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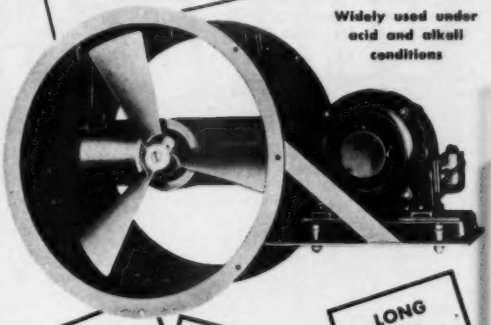
Widely used under acid and alkali conditions



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■ Propellair's "CS" Fan is a rugged, heavy-duty unit for duct installation. The cast aluminum airfoil propeller is housed in a heavy-gauge steel duct section with steel belt guard and internal bearing support. All-welded construction. *R&M All-Weather Motor* located outside airstream. Sizes from 20" to 60", with certified air deliveries of 3750 to 85,000 c.f.m. Also available with corrosion and abrasion-resisting finishes and with ventilated bearings for high temperatures.

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Propellair "CS" Fans are built to fit standard duct sizes without the need of elbows. The fan drum has front and rear flanges drilled for easy mounting into duct system.

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torrential rains, ice storms and so on. Attention is also given to the reaction of materials of construction when exposed to different conditions.

In closing, the book reports on man's efforts to alter weather. It covers such subjects as fog dispersal, wind breaks and frost prevention. Data on temperature and climatic conditions in different countries throughout the world is offered in the appendix.

"Don't Be a Statistic"

ACCIDENT FACTS. Size 6 by 9 in.; 98-pp booklet. Published by the National Safety Council, 425 N. Michigan Ave., Chicago, Ill. Price 75c.

CLASSIFIED AND SECTIONIZED under heading titled All Accidents, Occupational, Motor-Vehicle, Transportation, Public Non-Transport, Home, Farm, and School, this booklet lists the 1951 facts and figures on accidents.

The presentation uses a great deal of graphic art to convey the statistical material. Twenty-one pages are devoted exclusively to occupational accidents, and provide the factual background necessary to give an industrial safety program direction. Most common sources of injury, part of the body most frequently injured, off-the-job problems are included in the booklet.

Design Guide

PRACTICAL DESIGN GUIDE by Richard A. Rinehuis. Size 8½ by 11 in.; 125 pp; illustrated; spiral binding. May be obtained by writing to Box 549, Binghamton, New York. Price $2.00.

THIS GUIDE is prepared expressly for designers, draftsmen, inventors, toolmakers, methods engineers, production supervisors and students.

The four main purposes of the guides are to: suggest production ideas; present applications that have been proven in production; present the elements of pneumatics, cam design, electrical controls, automatic feeds, etc.; and present reliable information and sources of reference to design and production problems.

There are many helpful drawings throughout the guide to illustrate the design and operation of parts.

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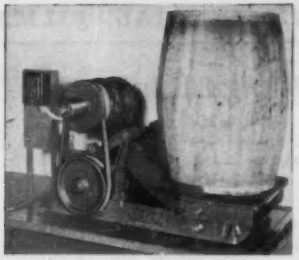

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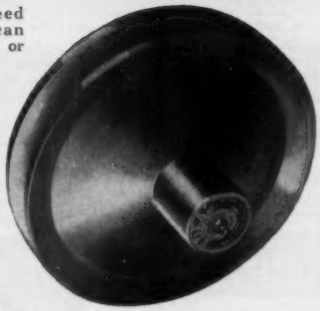

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Bulk Materials Handling Film

A NEW INDUSTRIAL film showing heavy bulk materials handling equipment in action is available for showings to industrial and engineering groups.

The film "Heavy Bulk Materials Handling" tells the story of the handling and transportation of coal and iron from the mine to the blast furnace.

It is available for showings by industrial or engineering groups at no charge other than postage. Reservations for this film can be made by writing to the advertising department, Heyl & Patterson, Inc., 55 Water St., Pittsburgh 22, Pa., giving name and organization and the date on which the film is to be shown.

Story of Aluminum

A SOUND MOTION picture produced in full color, running time 24 minutes, shows in an entertaining informative manner the story of aluminum and of the men who fabricate the metal into its thousands of end uses.

The film is entitled "Take a Look at Tomorrow." It is available for showings through the Kaiser Aluminum sales offices across the country, plant public relations offices, Kaiser distributors and also may be obtained by writing Kaiser Services, 1924 Broadway, Oakland, California.

Film on Meters

A NEW, 16-mm sound-color motion picture "Accent on Accuracy" is now available for showings. The film briefly discusses the principles and history of meters, and describes metering maintenance problems encountered by utilities.

The film also shows the radical design developments, manufacturing techniques, and quality-control procedures that have made possible the factory certification of General Electric I-50 watthour meters.

Prints of the new film (running time 25 minutes) are available for loan at General Electric Co. district apparatus offices.

Machine Molding

THIS FILM is available in both 16 mm motion film and 35 mm filmstrip. It is titled "Molding on a Jolt Roll-Over Pattern Draw Machine," and covers the principles of the jolt roll-over pattern draw machine. The film explains how to fill the drag and jolt it; draw the pattern; set the drag and cope pattern plates on master mold boards; and how to finish and close the mold.

Anyone wishing to purchase this film should send order to United World Films, Inc., 1445 Park Ave., New York 29, N. Y. Film is identified by order number OE 434 for the movie film and OE 434-frs for the filmstrip.

Cutting Tool Film

A FILM "Fundamentals of End Cutting Tools" is available in both 16 mm movie lm and 35 mm filmstrip. This film describes radius, threading, sheer-cut finishing, round-nosed finishing, and side-facing tools. Also explains the correct setting of the tools and the type of cut each one makes.

This film is available for purchase through the United World Films, Inc., 1445 Park Ave., New York 29, N. Y. The film is identified by order number, USOE, OE 43 for the movie, and OE 43-fs for the filmstrip.

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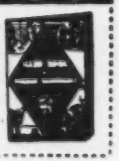

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Low Upkeep Cost
Trouble-Free
BEAVER NO. 26-R
1 TO 2-INCH PIPE THREADER

Right or left hand models

5 OUTSTANDING ADVANTAGES

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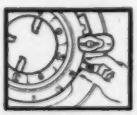
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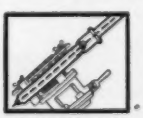
"Over 50 Years of Friendly Service"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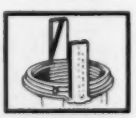
Universal Chuck · Accurate Centering · No Bushings


Cuts Taper or Straight Threads

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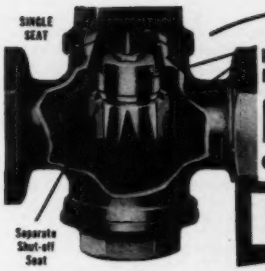

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CHARACTERIZED V-PORT

FLOWRITE VALVE

Gives Better Control with Less Maintenance

SPECIAL FLOW CHARACTERISTICS—High lift V-Port plug provides proportional flow throughout entire lift of stem as shown in chart below.

WIDE VARIETY OF SIZES—½" valve available with plugs to give 15%, 30%, 60% or 100% of maximum capacity. Easily interchangeable without removing valve from line.

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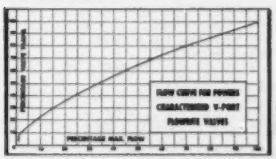

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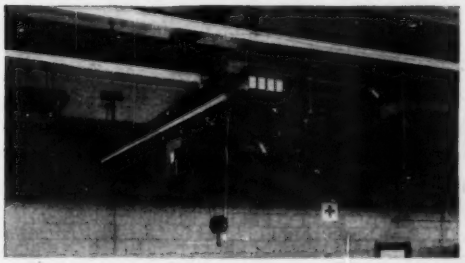

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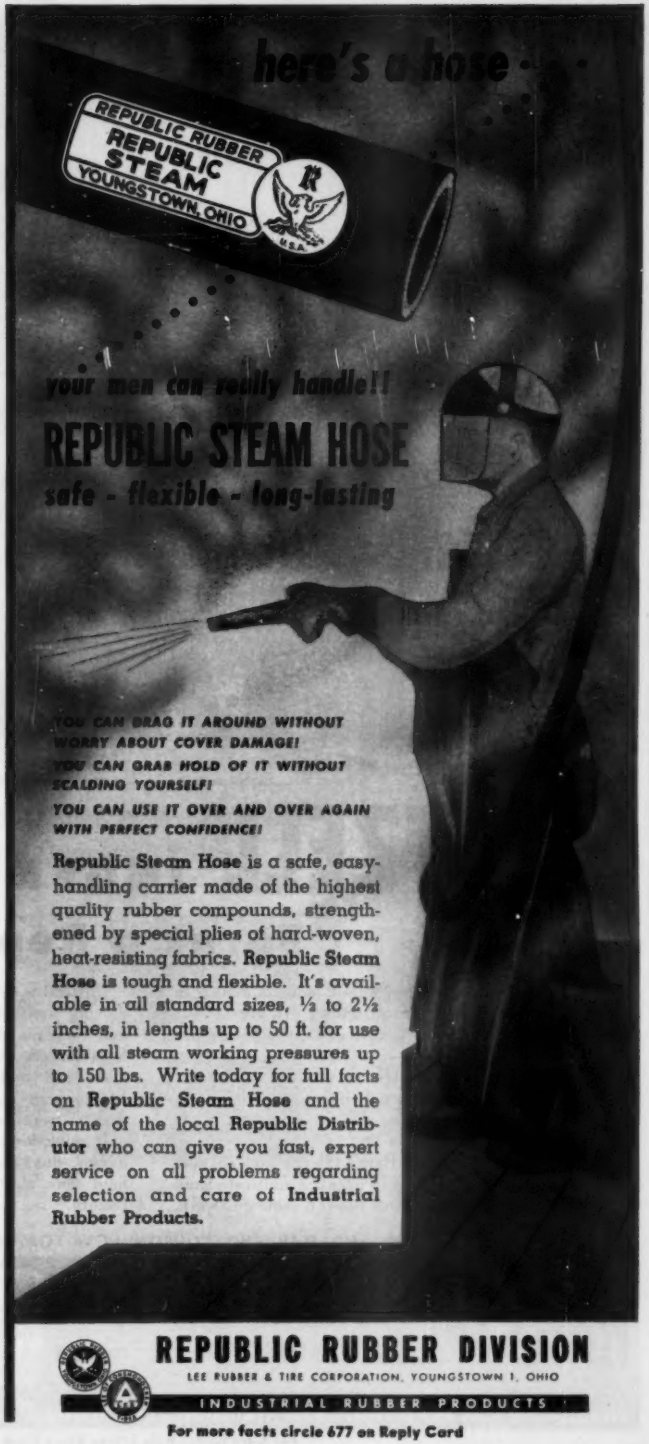
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your men can really handle!!
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Republic Steam Hose is a safe, easy-handling carrier made of the highest quality rubber compounds, strengthened by special plies of hard-woven, heat-resisting fabrics. Republic Steam Hose is tough and flexible. It's available in all standard sizes, ½ to 2½ inches, in lengths up to 50 ft. for use with all steam working pressures up to 150 lbs. Write today for full facts on Republic Steam Hose and the name of the local Republic Distributor who can give you fast, expert service on all problems regarding selection and care of Industrial Rubber Products.
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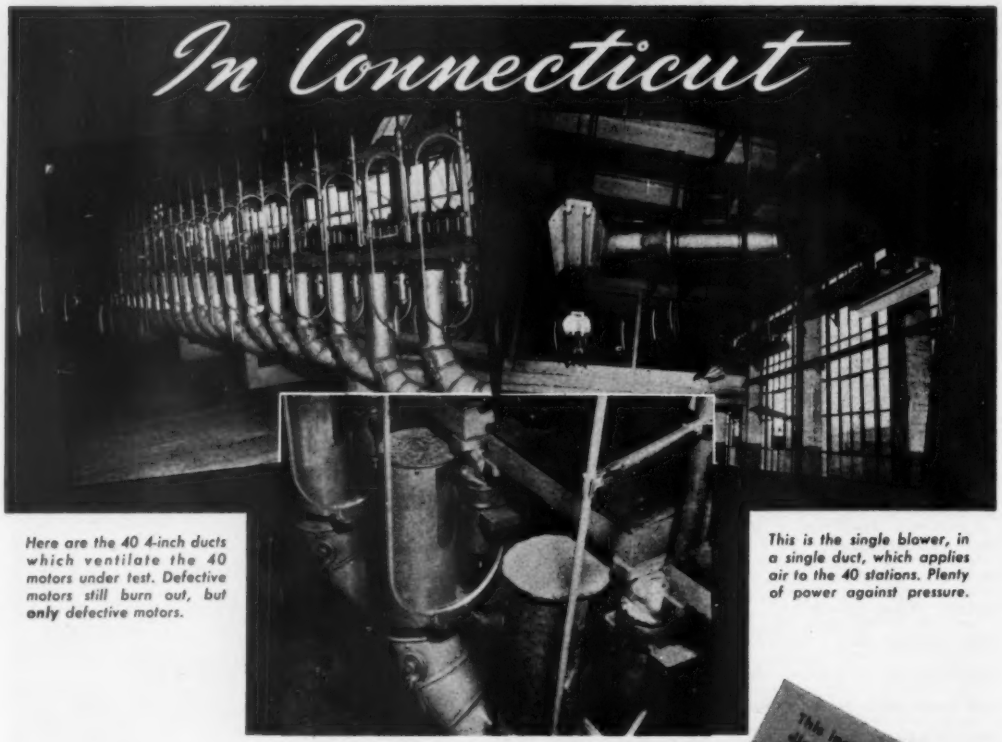

Here are the 40 4-inch ducts which ventilate the 40 motors under test. Defective motors still burn out, but only defective motors.

This is the single blower, in a single duct, which applies air to the 40 stations. Plenty of power against pressure.

Application of air to motor is mighty simple, as shown here. Yes, mighty simple . . . but mighty effective, too.

This installation was handled by the Hartzell field office at Fairfield, Connecticut; telephone 9-3349

HARTZELL INGENUITY
Earns a Repeat Order

Lack of ventilation caused automobile antenna motors in the plant of a Connecticut manufacturer to burn out far too often on the test stand. A bank of 40 testing stations was involved.

The Hartzell field engineer installed a Hartzell VA21-BD vaneaxial blower in a 21-inch duct, bringing in air from the outside. From this, a 4-inch duct delivers air to each of the 40 motors under test.

How well did it work out? Here's the one best answer: The plant operator is planning to install a duplicate bank of 40 more testing stations. Same blower, same ductwork.

Hartzell is set up to give you a *complete* answer to air-moving problems, simple or complicated, wherever you may be. Fans and blowers which move air economically. Experienced, close-at-hand direct factory field service to make sure you get *results*. That means real money to you. Figure your cost—the money you throw away—if the simplest ventilation job wastes just a half-horsepower.

If something in the air is causing trouble, costing money, don't put up with it. Call your nearby Hartzell field office *now*, or mail the coupon below to us at the factory.

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If student, check here for special information ☐

PROPELLER-TYPE FANS AND BLOWERS — ROOF VENTILATORS — UNIT HEATERS • ENGINEERING OFFICES IN PRINCIPAL CITIES

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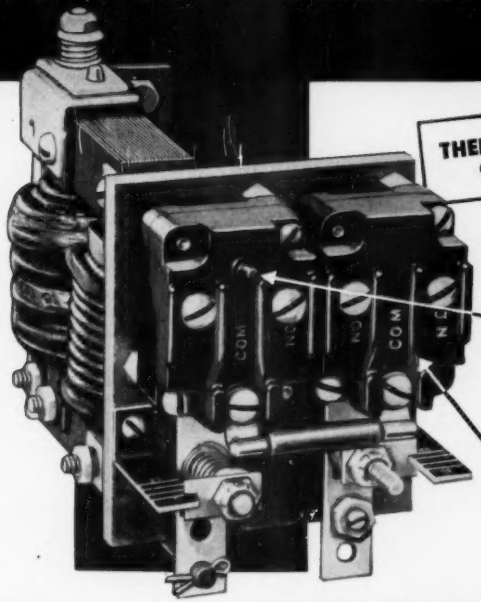
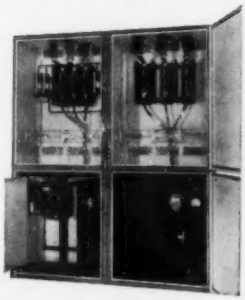
your best buy for protecting MOTORS and MOTOR CIRCUITS



you save more by continuity of service with EC&M Starters and new Thermal-Magnetic Overload Relays

THESE ADVANTAGES PAY-OFF ON ESSENTIAL DRIVES

1. No dashpots.
2. Motor operating-current electrically connected to tripping-element for quick response—for positive response.
3. Low current-setting for running protection without fear of false-trips during starting.
4. Red-nosed indicator and independent trips are time-savers on an outage.
5. Short reset time—15 to 20 seconds.
6. These new Type ZTM Overload Relays are available on all EC&M Starters. On systems where fault capabilities are large, investigate high interrupting capacity starters which eliminate the need for fused or circuit breaker protection.



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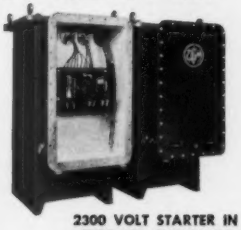

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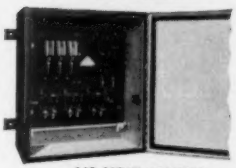

440 VOLT STARTER

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THE ELECTRIC CONTROLLER & MFG. CO.

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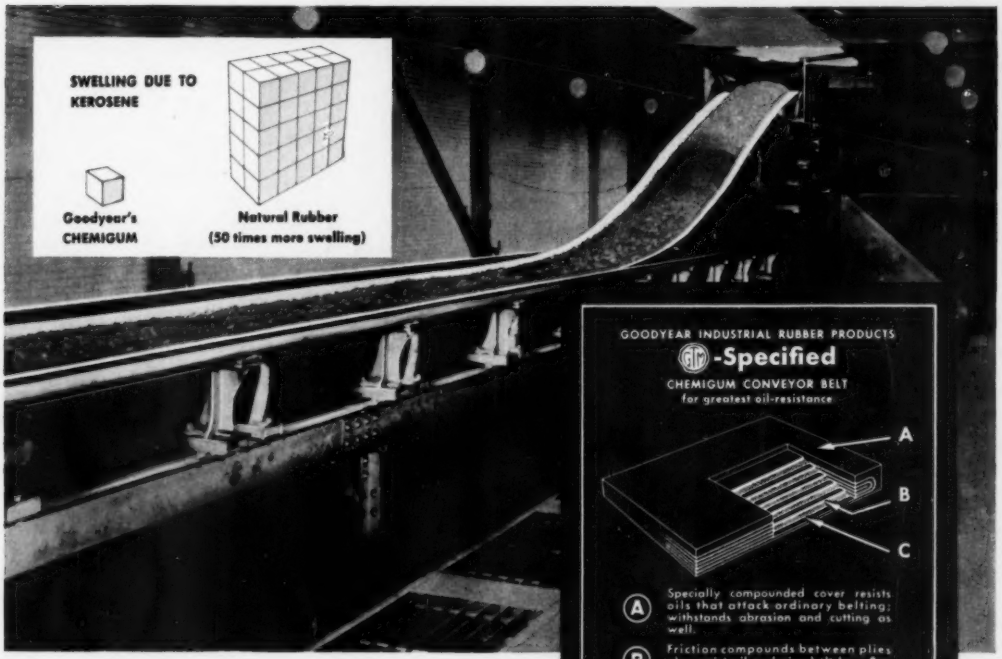
HERE'S graphic evidence of the oil-resistance built into the covers and carcass of CHEMIGUM conveyor belts—designed by the G.T.M.—Goodyear Technical Man—for use in service where severe oil and grease conditions cause premature failure of conventional belts.

Tests with kerosene show that Goodyear CHEMIGUM covers swell only 2% as much as high-grade conveyor covers made from natural rubber. (See Chart.) CHEMIGUM will also resist oil far better than many other oil-resisting synthetics used in belts. When destructive effects of such solvents are present, consult the G.T.M. for full details, or write Goodyear, Akron 16, Ohio.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Natural Rubber (50 times more swelling)
GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GT-Specified
CHEMIGUM CONVEYOR BELT
for greatest oil-resistance
A
B
C
A Specially compounded cover resists oils that attack ordinary belting; withstands abrasion and cutting as well.
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C Plies of duck reinforcement to fit individual job requirements.

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DECEMBER, 1952

Plant Engineering

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